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TECHNICAL MANUAL

WATER DISTRIBUTION AND WASTEWATER MANAGEMENT SYSTEM (WDWWMS)

U.S. ARMY MEDICAL MATERIEL AGENCY

MAY 2004

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TABLE OF CONTENTS

		Paragraph	Page
COVER			
REPRODUCTION AUTHORIZATION/RESTRICTIONS			
TABLE OF CONTENTS			
PREFACE			i
CHAPTER 1	WATER DISTRIBUTION SET (WDS) INTRODUCTION		
	General	1-1	1
	Components	1-2	6
	Principles of Installation	1-3	11
	Assembly	1-4	12
CHAPTER 2	WATER DISTRIBUTION SET (WDS) MF2K, 296-BED AND MRI, 264-BED CONFIGURATIONS OPERATOR AND REPAIR INSTRUCTIONS		
	Introduction	2-1	21
	Components	2-2	21
	Principles of Installation	2-3	33
	Assembly	2-4	37
	Operation	2-5	45
	Disassembly	2-6	45
	Preventive Maintenance	2-7	48
	Repair Procedures	2-8	49
CHAPTER 3	WATER DISTRIBUTION SET (WDS) MRI, 84-BED CONFIGURATION OPERATOR'S, PMCS, AND REPAIR INSTRUCTIONS		
	Introduction	3-1	51
	Components	3-2	51
	Principles of Installation	3-3	59
	Assembly	3-4	63
	Operation	3-5	71
	Disassembly	3-6	72
	Preventive Maintenance	3-7	74
	Repair Procedures	3-8	75

TABLE OF CONTENTS (continued)

		Paragraph	Page
CHAPTER 4	WATER DISTRIBUTION SET (WDS) MRI, 164-BED CONFIGURATION OPERATOR'S, PMCS, AND REPAIR INSTRUCTIONS		
	Introduction	4-1	77
	Components	4-2	77
	Principles of Installation	4-3	86
	Assembly	4-4	90
	Operation	4-5	98
	Disassembly	4-6	99
	Preventive Maintenance	4-7	101
	Repair Procedures	4-8	102
CHAPTER 5	WASTE-WATER AUGMENTATION SET (WWAS), MEDICAL FORCE 2000 (MF2K), 296-BED CONFIGURATION OPERATOR'S, PMCS, AND REPAIR INSTRUCTIONS		
	Introduction	5-1	105
	Components	5-2	105
CHAPTER 6	WASTEWATER MANAGEMENT SETS (WWMS) INTRODUCTION		
	Introduction	6-1	117
	Components	6-2	118
	Principles of Installation	6-3	120
CHAPTER 7	WASTEWATER MANAGEMENT SET (WWMS) MEDICAL FORCE 2000 (MF2K) 296-BED CONFIGURATION OPERATOR'S, PMCS, AND REPAIR INSTRUCTIONS		
	Introduction	7-1	123
	Components	7-2	123
	Principles of Installation	7-3	128
	Assembly	7-4	131
	Operation	7-5	133
	Disassembly	7-6	133
	Preventive Maintenance	7-7	135
	Repair Procedures	7-8	136
CHAPTER 8	WASTEWATER MANAGEMENT SET (WWMS), MEDICAL RE-ENGINEERING INITIATIVE (MRI), 84-BED CONFIGURATION OPERATOR INSTRUCTION, PMCS, AND REPAIR INSTRUCTIONS		
	Introduction	8-1	139
	Components	8-2	139

TABLE OF CONTENTS (continued)

		Paragraph	Page
CHAPTER 8	(continued)		
	Principles of Installation	8-3	142
	Assembly	8-4	145
	Operation	8-5	147
	Disassembly	8-6	147
	Preventive Maintenance	8-7	149
	Repair Procedures	8-8	150
CHAPTER 9	WASTEWATER MANAGEMENT SET (WWMS), MEDICAL RE-ENGINEERING INITIATIVE (MRI), 164-BED CONFIGURATION OPERATOR INSTRUCTION, PMCS, AND REPAIR INSTRUCTIONS		
	Introduction	9-1	153
	Components	9-2	153
	Principles of Installation	9-3	156
	Assembly	9-4	159
	Operation	9-5	161
	Disassembly	9-6	161
	Preventive Maintenance	9-7	163
	Repair Procedures	9-8	164
CHAPTER 10	OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL Including REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) PUMP, CENTRIFUGAL: FRAME MOUNTED, 1½ IN. MIL-P-14515D, ELECTRIC MOTOR DRIVEN, (E.C. SCHLEYER PUMP CO. MODEL 4M-SE2000)		
	Introduction		
	Scope	10-1	167
	Maintenance Records and Forms	10-2	167
	Equipment Serviceability Criteria (ESC)	10-3	167
	Description	10-4	167
	Identification and Tabulated Data	10-5	168
	Operation of Centrifugal Pump	10-6	169
	Starting	10-7	169
	Stopping	10-8	170
	Operation of Equipment	10-9	170
	Operation in Extreme Cold	10-10	170
	Operation in Extreme Heat	10-11	170
	Operation in Dusty or Sandy Areas	10-12	170

TABLE OF CONTENTS (continued)

		Paragraph	Page
CHAPTER 10	(continued)		
	Operation Under Rainy or Humid Conditions	10-13	170
	Operation in Salt Water Areas	10-14	170
	Operator/Crew Maintenance Instructions		
	General	10-15	171
	Detailed Lubrication Information	10-16	171
	PMCS - General	10-17	171
	PMCS	10-18	171
	Troubleshooting		
	General	10-19	173
	Organizational Maintenance Instructions		
	Service Upon Receipt of Equipment		
	Inspecting and Servicing Equipment	10-20	175
	Installation of Separately Packed Components	10-21	175
	Installation and Setting Up Instructions	10-22	175
	Movement to a New Worksite		
	Dismantling for Movement	10-23	177
	Reinstallation After Movement	10-24	177
	Repair Parts, Special Tools, and Equipment		
	Tools and Equipment	10-25	177
	Organizational Maintenance Repair Parts	10-26	177
	Lubrication Instructions	10-27	177
	Preventive Maintenance Checks And Services (PMCS)		
	General	10-28	178
	Preventive Maintenance Checks and Services	10-29	178
	Troubleshooting		
	General	10-30	180
	Troubleshooting	10-31	180
	Maintenance of the Pump		
	Centrifugal Pump Assembly	10-32	183
	Electric Motor Assembly	10-33	184
	Frame	10-34	185
	Direct Support and General Support Maintenance Instructions		
	Repair Parts, Special Tools, and Equipment		
	Special Tools and Equipment	10-35	186
	Maintenance Repair Parts	10-36	186

TABLE OF CONTENTS (continued)

		Paragraph	Page
CHAPTER 10	(continued)		
	Troubleshooting		
	General	10-37	186
	Troubleshooting	10-38	186
	General Maintenance		
	Electric Motor Testing	10-39	189
	Repair Instructions		
	Centrifugal Pump Assembly		
	Pump Removal	10-40	190
	Pump Disassembly	10-41	190
	Pump Cleaning and Inspection	10-42	192
	Pump Reassembly	10-43	192
	Pump Installation	10-44	192
	Pump Test	10-45	193
	Electric Motor Assembly		
	Motor Removal	10-46	193
	Motor Cleaning, Inspection, And Testing	10-47	194
	Motor Rewind Data	10-48	195
	Motor Reassembly	10-49	195
	Motor Installation	10-50	195
	Administrative Storage		
	Preparation of Equipment for Shipment	10-51	197
	Loading Equipment for Shipment	10-52	197
	Preparation of Equipment for Limited Storage	10-53	197
	Inspection and Maintenance of Equipment in Limited Storage	10-54	198
	Maintenance Allocation Chart		
	General	10-55	199
	Explanation of Columns	10-56	199
	Organizational, Direct Support, and General Support Maintenance Repair Parts, and Special Tools List		201
CHAPTER 11	OPERATOR AND ORGANIZATIONAL, MAINTENANCE MANUAL Including REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) PUMP, CENTRIFUGAL: FRAME MOUNTED, 1½ IN., ELECTRIC MOTOR DRIVEN, Modified Grainger Model 4XZ11 Pump		

TABLE OF CONTENTS (continued)

CHAPTER 11 (continued)

	Paragraph	Page
Introduction		
Scope	11-1	203
Maintenance Forms and Records	11-2	203
Equipment Serviceability Criteria	11-3	203
Description	11-4	203
Operating Instructions		
Operation of Centrifugal Pump	11-5	205
Starting	11-6	205
Stopping	11-7	206
Operation Under Unusual Conditions		
Operation of Equipment	11-8	206
Operation in Extreme Cold	11-9	206
Operation in Extreme Heat	11-10	206
Operation in Dusty or Sandy Areas	11-11	206
Operation Under Rainy or Humid Conditions	11-12	206
Operations in Salt Water Areas	11-13	207
Trouble Shooting		
General	11-14	208
Organization Maintenance Instructions		
Service upon Receipt of Equipment		
Inspecting and Servicing Equipment	11-15	210
Installation of Separately Packed Components	11-16	210
Installation and Setting-Up Instructions	11-17	210
Movement to a New Site	11-18	211
Reinstallation After Movement	11-19	211
Repair Parts, Special Tools, and Equipment		
Tools and Equipment	11-20	211
Organizational Maintenance Repair Parts	11-21	211
Lubrication Instructions	11-22	211
Preventive Maintenance Checks and Services (PMCS)		
General	11-23	212
Preventive Maintenance Checks And Services	11-24	212
Troubleshooting		
General	11-25	213
Troubleshooting	11-26	213
Storage		
Preparation of Equipment for Shipment	11-27	215
Loading Equipment for Shipment	11-28	215
Preparation of Equipment for Limited Storage	11-29	215
Inspection and Maintenance of		

TABLE OF CONTENTS (continued)

		Paragraph	Page
	Equipment in Limited Storage	11-30	216
	Maintenance Allocation Chart		
	Introduction		
	General	11-31	217
	Explanation of Columns	11-32	217
	Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List		220
CHAPTER 12	OPERATOR AND MAINTAINER MANUAL PUMP UNIT, RECIPROCATING 13229E7222 MOTOR DRIVEN (EDSON CORPORATION, MODEL 120EWA)		
	Introduction	12-1	221
	Maintenance Forms and Records	12-2	221
	Equipment Serviceability Criteria (ESC)	12-3	221
	Description	12-4	221
	Principles of Installation	12-5	222
	Preventive Maintenance	12-6	222
	Maintenance and Troubleshooting	12-7	222
CHAPTER 13	OPERATOR AND MAINTAINER INSTRUCTIONS HYPOCHLORINATION UNIT Waltron Model WAL 1031-96		
	Introduction		
	Scope	13-1	227
	Maintenance Forms and Records	13-2	227
	Equipment Serviceability Criteria (ESC)	13-3	227
	Description	13-4	227
	Operating Instructions		
	Operation of the Hypochlorination Unit	13-5	228
	Starting	13-6	228
	Shutdown	13-7	229
	Operation of Equipment	13-8	229
	Operation Under Unusual Conditions		
	Operation in Extreme Cold	13-9	229
	Operation in Extreme Heat	13-10	229
	Operation in Dusty or Sandy Areas	13-11	229
	Operation Under Rainy or Humid Conditions	13-12	230
	Organizational Maintenance Instructions		
	Service Upon Receipt of Unit		
	Inspecting and Servicing The Unit	13-13	231

TABLE OF CONTENTS (continued)

		Paragraph	Page
CHAPTER 13	(continued)		
	Troubleshooting		
	General	13-14	234
	Movement to a New Site		
	Dismantling for Movement	13-15	235
	Reinstallation After Movement	13-16	235
	Repair Parts, Special Tools and Equipment		
	Tools and Equipment	13-17	236
	Organizational Repair Parts	13-18	236
	Preventive Maintenance Checks and Services (PMCS)		
	General	13-19	236
	Preventive Maintenance Checks and Services	13-20	236
	Storage		
	Preparation of Equipment for Shipment	13-21	237
	Loading Equipment for Shipment	13-22	238
	Preparation of Equipment for Limited Storage	13-23	238
	Inspection and Maintenance of Equipment in Limited Storage	13-24	238
CHAPTER 14	OPERATOR AND MAINTAINER INSTRUCTIONS HEATER, WATER, 9,000 WATTS NSN 4520-01-493-7423, PN 11739		
	Introduction	14-1	241
	Maintenance Forms and Records	14-2	241
	Equipment Serviceability Criteria (ESC)	14-3	241
	Description	14-4	241
	Operating Instructions		
	Operation of the Heater, Water	14-5	241
	Starting	14-6	241
	Set-Up	14.6.1	241
	Start-Up	14.6.2	242
	Shutdown	14.7	242
	Cleaning Instructions	14.8	242
	Organizational Maintenance Instructions		
	Service Upon Receipt of Unit		
	Inspecting and Servicing the Heater	14.9	243

TABLE OF CONTENTS (continued)

		Paragraph	Page
CHAPTER 14	(continued)		
	Troubleshooting	14.10	245
	Movement to a New Site		
	Dismantling for Movement	14.11	246
	Reinstallation After Movement	14.12	246
	Repair Parts, Special Tools, and Equipment		
	Tools and Equipment Organizational Maintenance	14.13	247
	Repair Parts	14.14	247
	Preventive Maintenance Checks and Services (PMCS)		
	General	14.15	247
	Preventive Maintenance Checks and Services (PMCS)	14.16	247
	Storage		
	Preparation of Equipment for Shipment	14.17	248
	Loading the Heater for Shipment	14.18	249
	Preparation of the Heater for Limited Storage	14.19	249
	Inspection and Maintenance of the Heaters in Limited Storage	14.20	249

Tables

			Page
Table	10-1	Preventive Maintenance, Checks, and Services (Pump Unit, Centrifugal)	172
	10-2	Troubleshooting (Pump Unit, Centrifugal)	173
	10-3	Preventive Maintenance Checks and Services (PMCS)	178
	10-4	Troubleshooting (Electric Motor and Pump)	180
	10-5	Troubleshooting (DS/GS Level)	187
	11-1	GPM Ratings	204
	11-2	Preventive Maintenance, Checks, and Services (PMCS) – Before Operation	205
	11-3	Preventive Maintenance, Checks, and Services (PMCS) – During Operation	207
	11-5	Troubleshooting	208
	11-7	Preventative Maintenance Checks and Services (PMCS) – Organizational Maintenance	212
	11-8	Troubleshooting – Organizational Maintenance	213
	12-1	Troubleshooting (Pump Unit, Reciprocating)	224
	13-1	Preventive Maintenance, Checks, and Services (PMCS) – Before Operation	232
	13-2	Preventive Maintenance, Checks, and Services (PMCS) – During Operation	232

Tables (continued)

		Page
13-3	Preventive Maintenance, Checks and Services (PMCS) – After Operations	233
13-4	Troubleshooting	234
13-5	Preventive Maintenance Checks and Services (PMCS) – Organizational Maintenance	236
14.1	Preventive Maintenance, Checks, and Services (PMCS) – Before Operation	244
14.2	Preventive Maintenance, Checks, and Services (PMCS) – During Operation	244
14.3	Preventive Maintenance, Checks and Services (PMCS) – After Operations	244
14.4	Troubleshooting	245
14.5	Preventive Maintenance Checks and Services (PMCS) – Organizational Maintenance	247

List of Figures

			Page
Figure	1-1	296-Bed CSH (MF2K) General Layout	3
	1-2	84-Bed CSH (MRI) General Layout	4
	1-3	164-Bed CSH (MRI) General Layout	5
	1-4	Water Hose Connection to the CMS ISO	14
	1-5	Connection to a Single Receptacle ISO (with hose)	15
	1-6	Connection to a Single Receptacle ISO (without hose)	16
	1-7	Fittings at the Start of a 1-Inch Loop	17
	1-8	Fittings on Return Side of a 1-Inch Loop	18
	1-9	Field Sink Connections	19
	1-10	Channel, Hose Protector (Surface)	20
	1-11	Channel, Hose Protector (Subsurface)	20
	2-1	Cam-Lock Connection	21
	2-2	Tank, Fabric, Collapsible, 20,000 Gallon, Laid Out on Ground	22
	2-3	Tank, Fabric, Collapsible, 3,000 Gallon (Onion Type)	22
	2-4	Tank, Fabric, Collapsible, 3,000 Gallon (Pillow Type)	22
	2-5	Pump Unit, Centrifugal, 65 GPM	23
	2-6	Valve, Gate, 1½-inch female, 2-inch male	24
	2-7	Valve, Gate, 1½-inch female, 2-inch male	24
	2-8	Valve, Globe, 1½-inch female, 1½-inch male	24
	2-9	Valve, Gate, 1-inch female, 1-inch male	25
	2-10	Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch male x 1-inch male	25
	2-11	Tee Assembly, Quick Disconnect, 1-inch female x 1-inch male x 1-inch male	25
	2-12	Tee Assembly, Quick Disconnect, 1½-inch male x 1½-inch male x 1½-inch female	26
	2-13	Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch female x 1½-inch male	26
	2-14	Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch male x 1-inch male	26
	2-15	Tee Assembly, Quick Disconnect, 1½-inch male x 1-inch female x 1½-inch female	26

List of Figures (continued)

		Page
2-16	Tee Assembly, Quick Disconnect, 1-inch male x 1½-inch male x 1½-inch female	26
2-17	Tee Assembly, Quick Disconnect, 1-inch male x 1½-inch female x 1½-inch male	27
2-18	Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch male x ¼-inch male	27
2-19	Coupling Assembly, Quick Disconnect, 1-inch female x 1-inch female	27
2-20	Plug, Quick Disconnect	27
2-21	Adapter, Straight Hose to Boss	28
2-22	Valve, Check	28
2-23	Adapter Assembly, Quick Disconnect	28
2-24	Reducer, Quick Disconnect, 1-inch female to 1½-inch male	28
2-25	Reducer, Quick Disconnect, 1½-inch female to 1-inch male	28
2-26	Pipe Assembly, Potable Water (Pressure Gauge)	29
2-27	Pipe Assembly, Potable Water (Flow Meter)	29
2-28	Indicator Assembly	29
2-29	Case, Electronic-Electrical Test	29
2-30	Stand Assembly, Distribution Nozzle	30
2-31	Nozzle Assembly, Water	30
2-32	Strainer Sediments	30
2-33	Storage and Retrieval Materiel System	31
2-34	Reel Assembly, Hose	31
2-35	Cage, Wire, Folding	32
2-36	Pump Unit, Centrifugal	32
2-37	Hypochlorination Unit	32
2-38	Heater, Water, 9,000 Watts	33
2-39	Channel, Hose Protector (Subsurface)	34
2-40	Channel, Hose Protector (Surface)	34
2-41	Recommended Water Distribution Layout for the 296-Bed MF2K CSH	36
2-42	Water Hose Connection to the CMS ISO	39
2-43	Connection to a Single Receptacle ISO (with hose)	40
2-44	Connection to a Single Receptacle ISO (without hose)	41
2-45	Hamilton Sink Connection	43
2-46	Field Sink Connection	43
2-47	Suggested Method of Rolling 1½-inch Hose	47
2-48	Hose Repair	49
3-1	Cam-Lock Connection	51
3-2	Tank, Fabric, Collapsible, 5,000 Gallon	52
3-3	Pump, Centrifugal, 65 GPM	52
3-4	Valve, Gate, 1½-inch female, 2-inch male	53
3-5	Valve, Gate, 1½-inch male, 2-inch female	53
3-6	Valve, Globe, 1 ½-inch female, 1 ½-inch male	54
3-7	Valve, Gate, 1-inch female, 1-inch male	54
3-8	Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch male x 1-inch male	54
3-9	Tee Assembly, Quick Disconnect, 1-inch female x 1-inch male x 1-inch male	54
3-10	Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch female x 1½-inch male	55

List of Figures (continued)

		Page
3-11	Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch male x ¼-inch male	55
3-12	Coupling Assembly, Quick Disconnect, 1-inch female, 1-inch female	55
3-13	Plug, Quick Disconnect	55
3-14	Adapter, Straight Hose to Boss	56
3-15	Valve, Check	56
3-16	Adapter Assembly, Quick Disconnect, 4-inch female to 1½-inch male	56
3-17	Reducer, Quick Disconnect, 1-inch female to 1½-inch male	56
3-18	Reducer, Quick Disconnect, 1½-inch female to 1-inch male	56
3-19	Pipe Assembly, Potable Water (Pressure Gauge)	57
3-20	Pipe Assembly, Potable Water (Flowmeter)	57
3-21	Indicator Assembly	57
3-22	Case, Electrical-Electronic Test	57
3-23	Stand Assembly, Distribution Nozzle	58
3-24	Nozzle Assembly, Water	58
3-25	Strainer, Sediment	58
3-26	Cage, Wire, Folding	58
3-27	Pump Unit, Centrifugal	59
3-28	Hypochlorination Unit	59
3-29	Heater, Water, 9,000 Watts	59
3-30	Channel, Hose Protector (Subsurface)	61
3-31	Channel, Hose Protector (Surface)	61
3-32	Recommended Water Distribution Layout for MRI 84-Bed CSH	62
3-33	Water Hose Connection to CMS ISO	65
3-34	Connection to a Single Receptacle ISO (with hose)	66
3-36	Connection to a Single Receptacle ISO (without hose)	67
3-37	Hamilton Sink Connection	69
3-38	Field Sink Connection	70
3-39	Suggested Method of Rolling 1½-Inch Hose	73
3-40	Hose Repair	75
4-1	Cam-Lock Connection	77
4-2	Tank, Fabric, Collapsible, 20,000 Gallon, Laid Out On Ground	78
4-3	Pump Unit, Centrifugal, 65 GPM	78
4-4	Valve, Gate, 1½-inch F x 2-inch M	79
4-5	Valve, Check, 1½-inch F x 2-inch M	80
4-6	Valve, Globe, 1½-inch F x 1½-inch M	80
4-7	Valve, Gate, 1-inch F x 1-inch M	80
4-8	Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x 1-inch M	80
4-9	Tee Assembly, Quick Disconnect, 1-inch F x 1-inch M x 1-inch M	81
4-10	Tee Assembly, Quick Disconnect, 1½-inch M x 1½-inch M x 1½-inch F	81
4-11	Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x 1-inch M	81
4-12	Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x ¼-inch M	81
4-13	Coupling Assembly, Quick Disconnect, 1-inch F x 1-inch F	82
4-14	Plug, Quick Disconnect (field sink adapter)	82
4-15	Adapter, Straight Hose to Boss	82

List of Figures (continued)

		Page
4-16	Reducer, Quick Disconnect, 1-inch F to 1½-inch M	82
4-17	Reducer, Quick Disconnect, 1½ -inch F to 1-inch M	82
4-18	Pipe Assembly, Potable Water (Pressure Gauge)	83
4-19	Pipe Assembly, Potable Water (Flowmeter)	83
4-20	Indicator Assembly (Sight – Level)	83
4-21	Stand Assembly, Distribution Nozzle	84
4-22	Nozzle Assembly, Water	84
4-23	Strainer Sediment	84
4-24	Skip Box, Materiel Handling	84
4-25	Pump Unit, Centrifugal, 65GPM	85
4-26	Hypochlorination Unit	85
4-27	Heater, Water, 9,000 Watts	86
4-28	Channel, Hose Protector (Subsurface)	87
4-29	Channel, Hose Protector (Surface)	87
4-30	Recommended Water Distribution Layout for MRI 164-Bed Configuration	89
4-31	Water Hose Connection to the CMS ISO	92
4-32	Connection to a Single Receptacle ISO (With Hose)	93
4-33	Connection to a Single Receptacle ISO (Without Hose)	94
4-34	Hamilton Sink Connection	96
4-35	Field Sink Connection	97
4-36	Suggested Method of Rolling 1½-inch Hose	101
4-37	Hose Repair	103
5-1	Cam-Lock Connection	105
5-2	Coupling Half, Universal, Quick Disconnect	106
5-3	Coupling Connection	106
5-4	Tank Assembly, Fabric, Collapsible (3,000 Gallon – Onion Type)	106
5-5	Pump Unit, Centrifugal, 65GPM (Potable Water)	106
5-6	Pump Unit, Reciprocating (Wastewater)	107
5-7	Valve, Check	108
5-8	Valve, Gate, 1-inch F x 1-inch M	109
5-9	Valve, Gate, 1½-inch F x 2-inch M	109
5-10	Valve, Gate, 2-inch F x 1½-inch M	109
5-11	Valve, Gate, 4-inch F x 4-inch M	109
5-12	Valve, Globe, 1½-inch F x 1½-inch M	110
5-13	Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x 1-inch M	110
5-14	Tee Assembly, Quick Disconnect, 1½-inch M x 1½-inch M x 1½-inch F	110
5-15	Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch F x 1½-inch M	110
5-16	Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x ¼-inch M	111
5-17	Coupling Assembly, Quick Disconnect, 1-inch F x 1-inch F	111
5-18	Plug, Quick Disconnect (field sink adapter)	111
5-19	Adapter, Straight Hose to Boss	111
5-20	Adapter, Sink (for Hamilton Sink)	112
5-21	Wye, Quick Disconnect	112
5-22	Valve, Ball	112
5-23	Pipe Assembly, Potable Water (Pressure Gauge)	112
5-24	Pipe Assembly, Potable Water (Flowmeter)	113

List of Figures (continued)

		Page
5-25	Indicator Assembly (Sight – Level)	113
5-26	Case, Electrical-Electronic Test	113
5-27	Stand Assembly, Distribution Nozzle	113
5-28	Nozzle Assembly, Water	114
5-29	Strainer Sediment	114
5-30	Storage and Retrieval Materiel System	114
5-31	Reel Assembly, Hose	115
5-32	Skip Box, Materiel Handling	115
5-33	Pump Unit, Centrifugal, 65GPM	116
5-34	Hypochlorination Unit	116
5-35	Channel, Hose Protector (Subsurface)	116
5-36	Channel. Hose Protector (Surface)	116
7-1	Coupling Half, Universal, Quick Disconnect	123
7-2	Coupling Connection	124
7-3	Tank Assembly, Fabric, Collapsible, 20,000 Gallon, Laid Out on Ground	124
7-4	Tank Assembly, Fabric, Collapsible, 3,000 Gallon (Onion Type)	124
7-5	Hose Assembly, Nonmetallic	124
7-6	Adapter, Sink (for Hamilton Sinks)	125
7-7	Hose Assembly, Rubber (Drain Hose for Field Sinks)	125
7-8	Stand Assembly, Distribution Nozzle	126
7-9	Funnel Assembly	126
7-10	Valve, Ball	126
7-11	Storage and Retrieval Materiel System	127
7-12	Reel Assembly, Hose	127
7-13	Skip Box, Material Handling	128
7-14	Pump Unit, Reciprocating	129
7-15	Recommended Layout for the WWMS, MF2K, CSH, 296-Bed	130
7-16	Wye, Quick Disconnect	132
7-17	Hose Repair	137
8-1	Coupling Half, Universal, Quick Disconnect	139
8-2	Coupling Connection	140
8-3	Hose Assembly	140
8-4	Adapter, Sink (for Hamilton Sinks)	141
8-5	Hose Assembly, Rubber (Drain Hose for Field Sinks)	141
8-6	Stand Assembly, Distribution Nozzle	141
8-7	Funnel Assembly	141
8-8	Valve, Ball	142
8-9	Skip Box, Material Handling	142
8-10	Pump Unit, Reciprocating	143
8-11	Recommended Layout for the WWMS, MRI, CSH, 84-Bed	144
8-12	Wye, Quick Disconnect	146
8-13	Hose Repair	151
9-1	Coupling Half, Universal, Quick Disconnect	153
9-2	Coupling Connection	154
9-3	Tank Assembly, Fabric, Collapsible, 20,000 Gallon, Laid Out on Ground	154
9-4	Hose Assembly	154
9-5	Adapter, Sink (for Hamilton Sinks)	155
9-6	Hose Assembly, Rubber (Drain Hose for Field Sinks)	155
9-7	Stand Assembly, Distribution Nozzle	155
9-8	Funnel Assembly	155

List of Figures (continued)

		Page
9-9	Valve, Ball	156
9-10	Skip Box, Material Handling	156
9-11	Pump Unit, Reciprocating	157
9-12	Recommended Layout for the WWMS, MRI, CSH, 164-Bed	158
9-13	Wye, Quick Disconnect	160
9-14	Hose Repair	165
10-1	Electric, Motor-Driven Pump (Front View)	168
10-2	Electric Motor	169
10-3	Installation and Setting Up Instructions	176
10-4	Pump Unit, Centrifugal, 65GPM	177
10-5	Cover Plate Removal	183
10-6	Impeller Removal	183
10-7	Plate, Shaft, Adapter, and Seal Assembly Removal	184
10-8	Pump Removal	184
10-9	Electric Motor Assembly	185
10-10	Centrifugal Pump Assembly	191
10-11	Electric Motor Blowout Drawing	194
11-1	Electric Motor Driven Pump (front view)	204
11-2	Teel, High Head, Centrifugal Pump Motor – 4XZ11	204
11-3	Pump Schematics (showing input and discharge ports)	210
12-1	Pump Unit, Reciprocating (side view)	221
12-2	Suction and Discharge	224
13-1	Hypochlorination Unit	228
13-2	Tee Assembly, 1½-inch F x 1½-inch M x ¼-inch M	229
13-3	Hypochlorination Unit (component indication)	231
14-1	Heater, Water, 9,000 Watts	241
14-2	Heater Parts	242
14-3	Heater, Control Interior	243

APPENDICES

		Page
APPENDIX A	INVENTORY LIST WATER DISTRIBUTION SET, HOSPITAL, DEPMEDS WASTEWATER MANAGEMENT SET, HOSPITAL DEPMEDS WASTE WATER AUGMENTATION SET, HOSPITAL WDWWMS MAINTENANCE SET, HOSPITAL, DEPMEDS	251
APPENDIX B	INVENTORY LIST WATER DISTRIBUTION SET, MRI, 84-BED WASTEWATER MANAGEMENT SET, MRI, 84-BED MAINTENANCE SET, WDWWMS, MRI, 84-BED WATER DISTRIBUTION CONNECTION SET	265
APPPENDIX C	INVENTORY LIST WATER DISTRIBUTION SET, MRI, 164-BED WASTEWATER MANAGEMENT SET, MRI, 164-BED MAINTENANCE SET, WDWWMS, MRI, 164-BED WATER DISTRIBUTION CONNECTION SET	271

APPENDICES

		Page
APPENDIX D	ORGANIZATIONAL MAINTENANCE REPAIR PARTS AND COMPONENTS – WATER DISTRIBUTION SET	277
APPENDIX E	ORGANIZATIONAL MAINTENANCE REPAIR PARTS AND COMPONENTS – WASTEWATER MANAGEMENT SET	333
APPENDIX F	ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE, REPAIR PARTS AND SPECIAL TOOLS LIST – PUMP UNIT, CENTRIFUGAL, 65 GPM	351
APPENDIX G	ORGANIZATION MAINTENANCE REPAIR PARTS AND COMPONENTS – HYPOCHLORINATION UNIT	367

PREFACE

Hospitalization is one of the major Army Medical Department (AMEDD) function areas. Under the Statement of Need, contained in the Operational Requirements Document (ORD), approved by Headquarters, Department of the Army on 4 February 2003, it states that "There is a need to improve the distribution of potable water and the removal of waste water from selected patient care and other areas of the Combat Support Hospital (CSH)".

The system is a group of assemblages whose components, when assembled and used together, form a potable water distribution and wastewater management system for the CSH.

The water distribution portion I used to deliver potable water to hospital wards (intensive care, intermediate care, pre-op), central materiel supply, pharmacy, x-ray, blood laboratory, laboratory, emergency medical treatment, and the dental clinic. It is not intended to provide water to the laundry, food feeding, showers, or toilets.

The wastewater portion allows the transfer of wastewater from these same areas to holding areas.

Prior to the inception of this system, there was no satisfactory method for distribution potable water to and within core areas of the hospital. Water had to be carried and distributed manually in 5-gallon cans which was a labor intensive effort. In addition, there was a strong possibility of water contamination, if extreme care was not taken, when filling, handling and distributing water in cans.

This manual provides the operator and maintainer instructions for the Water Distribution and Wastewater Management System. This system comes in three basic configurations:

- Medical Force 2000 (MF2K) – 296 Beds
- Medical Re-Engineering Initiative (MRI) – 84 Beds
- Medical Re-Engineering Initiative (MRI) – 164 Beds

It is designed to be used for the Combat Support Hospitals (CSH) in the Corps and Echelons above Corps areas.

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedure, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: **Commander, U.S. Army Medical Materiel Agency, ATTN: MCMR-MMT-E (WDSWWMS), 1423 Sultan Drive, Fort Detrick, Maryland 21702-5001**. A reply will be furnished to you.

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CHAPTER 1

WATER DISTRIBUTION SET (WDS)

INTRODUCTION

1.1 General

a. This chapter describes the components as well as the assembly, operation, and dis-assembly of the Water Distribution Sets (WDS). The combination of hoses, fittings, gauges, and valves provides maximum flexibility in setting up the sets. This flexibility will enable you to set up the sets in almost any configuration that will accommodate the hospital's mission.

b. The Water Distribution Sets come in three basic configurations depending on the type of Combat Support Hospital to which it is authorized.

- Water Distribution Set, Hospital, DEPMEDS (MF2K, 296 Bed)
- Water Distribution Set, MRI, 84 Bed (CORPS)
- Water Distribution Set, MRI, 164 Bed (CORPS)

The basic components of these three configurations are identical; the only difference is the number or components authorized.

c. The Water Distribution Set, Hospital, DEPMEDS (MF2K, 296-Bed) (LIN: W53055) comes in three basic versions.

- Distribution Set, Hospital, DEPMEDS (MF2K, 296 Bed) – 2000 (NSN: 6545-01-435-6014). This is version of the set comes with Storage and Retrieval Materiel System (NSN: 3990-01-449-1997), for the storage of fittings; and Reel Assembly, Hose (NSN: 3990-01-449-3850), for the storage of hoses.

- Distribution Set, Hospital, DEPMEDS (MF2K, 296 Bed) – 2002 (NSN: 6545-01-435-6014). In this version the Storage and Retrieval Materiel System and the Reel Assembly Hose has been replaced by a Folding Wire Basket (NSN: 3990-01-505-5922).

- Distribution Set, Hospital, DEPMEDS (MF2K, 296 Bed) – 2003 (NSN: 6545-01-507-7170). In this version the Pump Unit, Centrifugal (65 GPM) (NSN: 4320-01-440-4421) has been replaced with the Pump Unit, Centrifugal (NSN: 4320-01-506-4459).

d. One of the main reasons for the water distribution set is to control infection and communicable diseases in the hospital. It is essential that the water be of the highest possible quality.

Coordinate early for preventive medicine personnel to inspect, take samples from, and analyze the water distribution system.

Advise hospital personnel that the water from the system cannot be considered potable until certified by preventive medicine personnel.

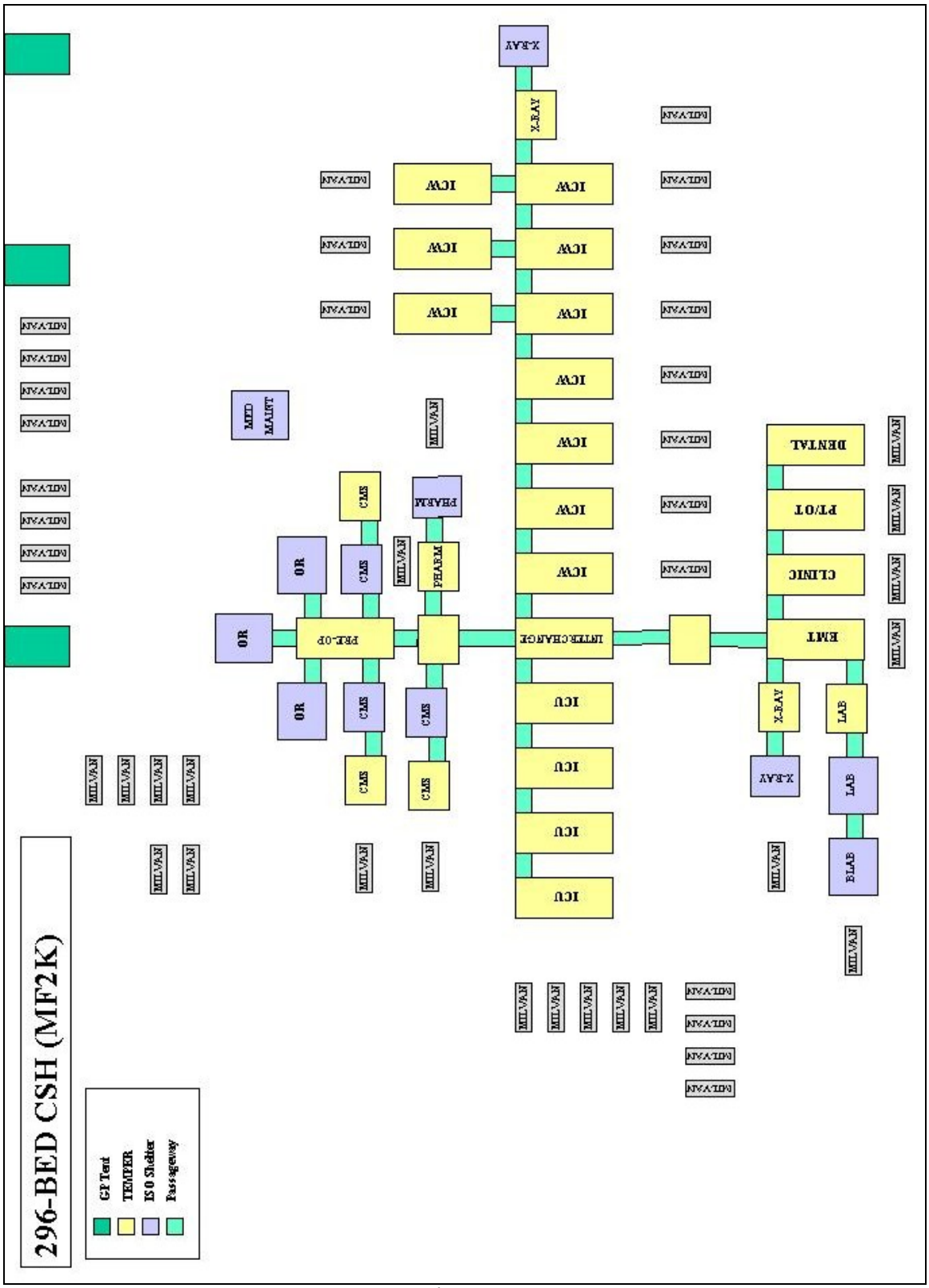


Figure 1-1
296-Bed CSH (MF2K) General Layout

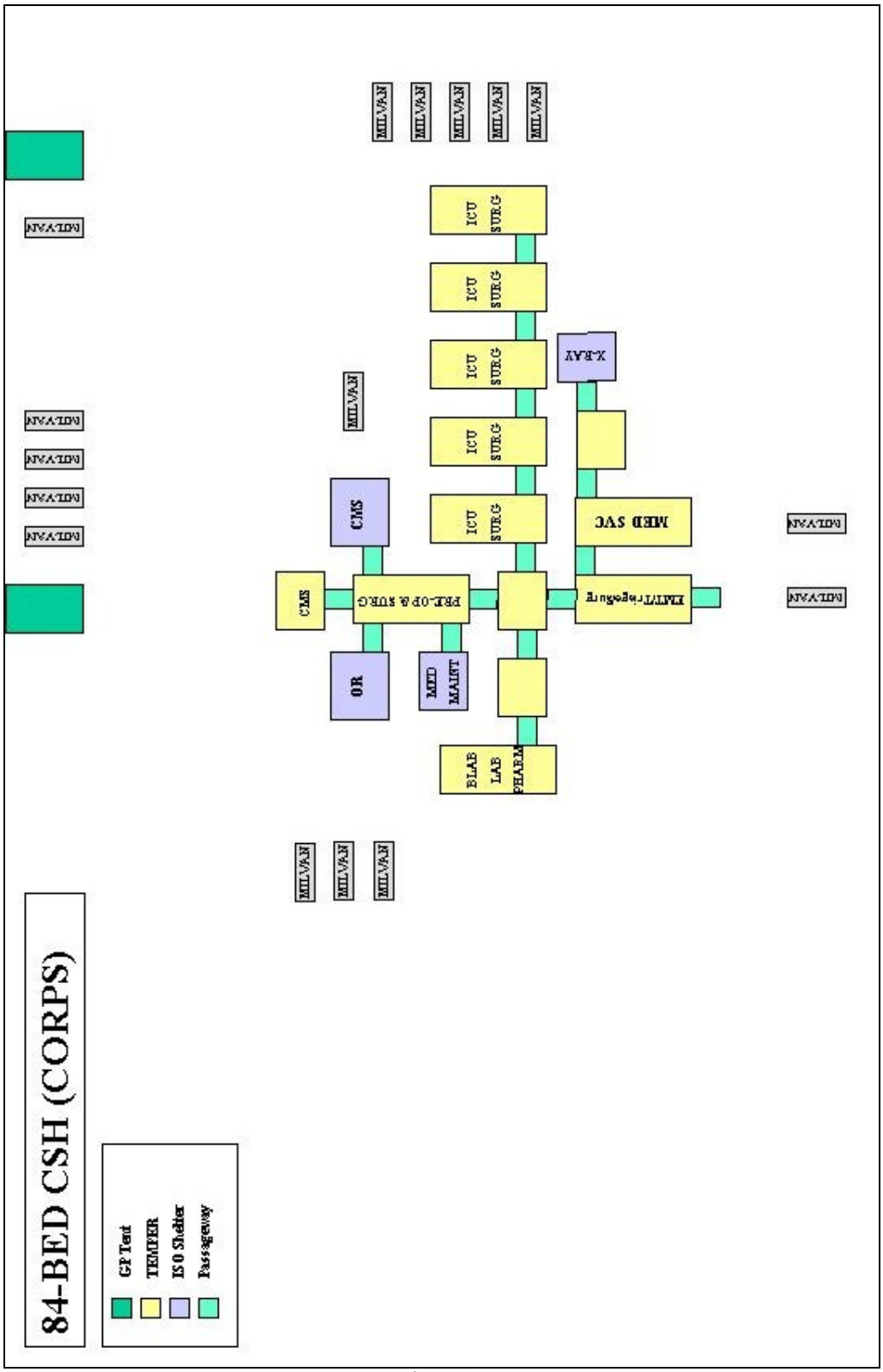


Figure 1-2
84-Bed (MRI) General Layout

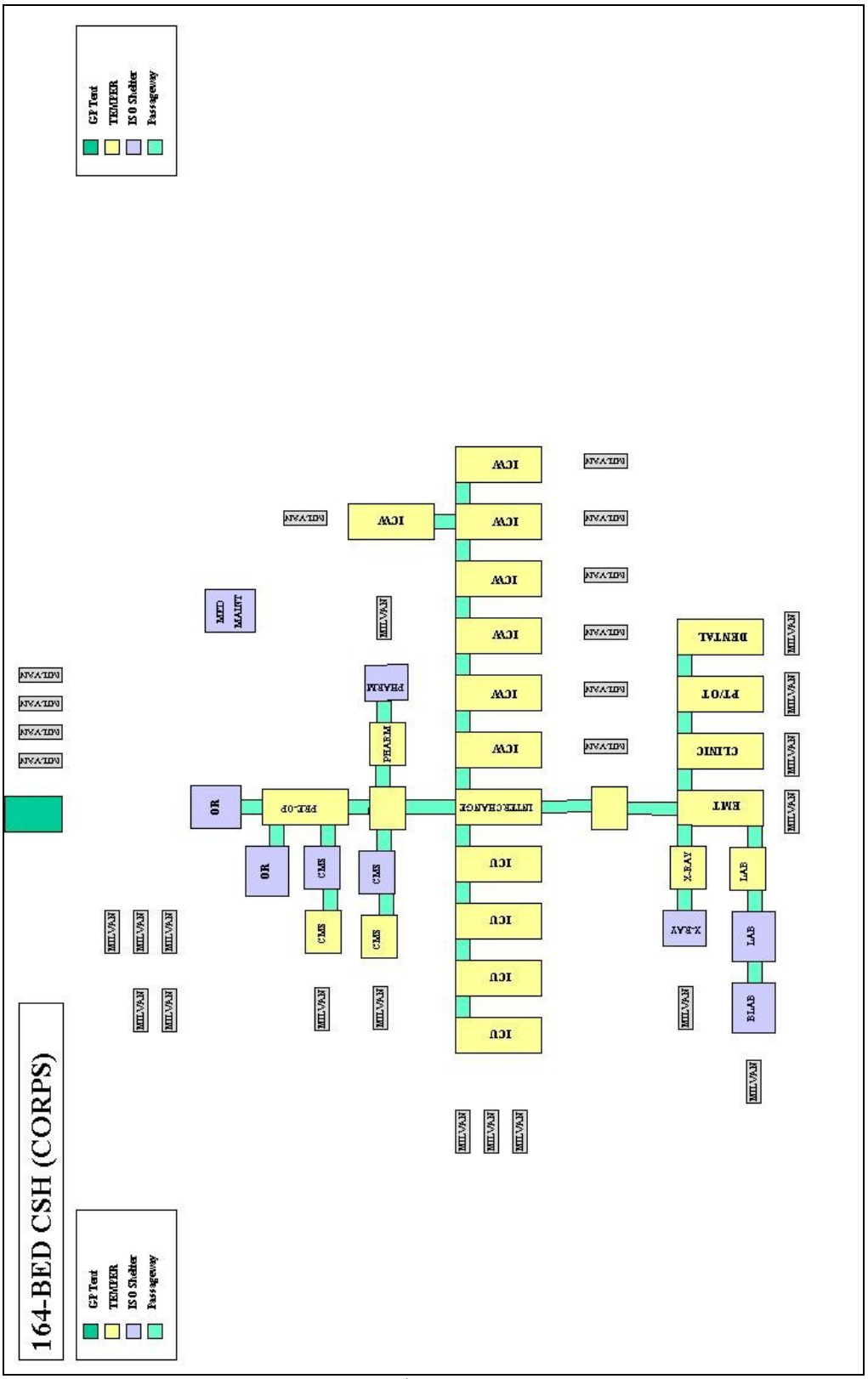


Figure 1-3
164-Bed (MRI) General Layout

1.2. Components

a. *Cam-Lock Connections*. With one exception, every connection in the water distribution system is cam-lock. That one exception is the field sink adapter, which is discussed later in this manual. Cam-lock is a quick connection system that requires no special training or tools. There are no threads. You simply insert the male end of the fitting into the female end of another fitting and pull the levers back to lock the two parts together. There are, however, precise steps in making and breaking this connection. These steps are discussed later in this manual.

b. *Water Storage Tanks*. Units will be authorized the following types and quantities of water tanks.

Types

- LIN T12938, Tank Fabric Collapsible, 20,000 Gallon Capacity
- Tank Fabric, Collapsible, 5,000 Gallon
- LIN T19033, Tank, Fabric Collapsible, 3,000 Gallon Capacity

Requirements

LIN	T12938		T19033
NSN	5430-01-406-0507	5430-01-506-1999	5430-01-170-6984
	20K Gal	5K Gal	3K Gal
MF2K	1	0	1
MRI 84	0	1	0
MRI 164	1	0	0

c. *Water Pump*. The water pump in this set, either NSN: 4320-01-440-4421 or NSN: 4320-01-506-4459 has a 220 volt, 3 phase, totally enclosed, fan-cooled, electric motor. Each pump has a Class “L” connector (NSN 5935-01-086-6421, PN MS90556C32413P) capable of interfacing with the DEPMEDS electrical distribution system. Each pump has a male and female 1½-inch cam-lock fitting.

Pump Requirements

- MF2K WDS – 2 each
- MRI, 84 Bed, WDS – 2 each
- MRI, 164 Bed, WDS – 3 each

One pump will serve the primary water distribution of the hospital, and the other(s) are used a secondary line(s) to maintain pressure. For the MF2K configuration, a third pump is located in the Waste-Water Augmentation Set. This third pump will be used in the event that the Hospital Unit, Surgical (HUS) and the Hospital Unit, Base (HUB) operate independently.

CAUTION
Two persons are required to lift or carry a water pump.

d. *Hoses*. All hoses in the water distribution systems are tan in color. Each hose has a blue stripe running its length indicating use for potable water.

When sections of hose are connected, they are bulky and heavy. To avoid injury, limit the amount of hose carried to 60 feet. The set comes with either hose reels that can be rolled or wire cages that

can be stacked and moved with a forklift. This is an effective way to move large amount of hose. **DO NOT DRAG THE HOSE.** You will damage it and the connections.

The hoses that are contained within the Water Distribution Set are:

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8338)
PN: 13225E9136-14
5 feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-175-5958)
PN: 13225E9136-12
10 feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-177-3714)
PN: 13225E9136-13
20 feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8337)
PN: 13225E9136-15
50 feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8336)
PN: 13225E9136-17
5 feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-7779)
PN: 13225E9135-9
10 feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8343)
PN: 13225E9136-9
10 feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8341)
PN: 13225E9136-10
20 feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8335)
PN: 13225E9136-18
50 feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-140-6288)
PN: 13225E9136-4
20 feet in length, 4-inch diameter

e. *Fitting and Valves*. There are numerous fittings and valves in the water distribution system. With one exception, every fitting in the set has cam-lock connections.

(1) Valve, Gate, 2 inch female, 1½-inch male (NSN 4820-01-440-8306) (PN: 13229E7178). This valve is attached to either the female cam-lock of the Water Tank, Fabric Collapsible, 3,000 gallon (NSN: 5430-01-170-6984), or to the female cam-lock of the adapter for the Water Tank, Fabric Collapsible, 5,000 gallon (NSN: 5430-01-506-1999), or Water Tank, Fabric Collapsible, 20,000 (5430-01-406-0507).

(2) Valve, Gate, 1½-inch female, 2-inch male (NSN 4820-01-440-8302) (PN: 13229E7177). This valve is attached to either the female cam-lock of the Water Tank, Fabric Collapsible. 3,000 gallon (NSN: 5430-01-170-6984), or to the female cam-lock of the adapter for the Water Tank, Fabric Collapsible, 5,000 (NSN: 5430-01-506-1999), or Water Tank, Fabric Collapsible, 20,000 gallon (5430-01-406-0507).

(3) Valve, Globe, 1½ inch

female, 1½-inch male. (NSN: 4820-01-440-8765) (PN: 13229E7169). This valve is attached to the 1½-inch loop, immediately after the beginning of a 1-inch loop. It is also used when multiple water tanks are arranged in parallel. In this application, this valve controls the rate of flow in the system.

(4) Valve, Gate, 1-inch female, 1-inch male (NSN 4820-01-440-7798) (PN: 13229E7167). When used with individual water users, such as field sinks and nozzles, these valve controls the rate of flow. It is also used at the beginning of secondary loops and long one-way water lines. Used this way, repairs or changes in the secondary loops can be made without interrupting water supply to the rest of the hospital.

(5) Valve, Check, 2-inch male, 1½-inch female. This is used on the side of the water tank to prevent back-flow of water into the system, which could contaminate the water supply or restrict operation of the water flow.

(6) Tee Assembly, Quick Disconnect, 1½ inch female, 1½ inch male, 1 inch male. (NSN: 4730-01-440-4609) (PN: 13229E7172) This fitting is used at each place where the one-way feeder lines branch off to the individual users, such as Central Material Supply (CMS), pharmacy, X-Ray, and laboratory. It is also used at the beginning and end of the secondary loop.

(7) Tee Assembly, Quick Disconnect, 1-inch female, 1-inch male, 1-inch male. (NSN: 4730-01-440-4091) (PN: 13229E0361) This fitting allows connection of the individual users along secondary loops or long one-way lines.

(8) Tee Assembly, Quick Disconnect, 1½ inch female, 1½ inch male, 1½ inch male. (NSN: 4730-01-440-4633) (PN: 13229E7182) This fitting is used on the return side of the primary loop.

(9) Tee Assembly, Quick Disconnect, 1½ inch female, 1½ inch female, 1½ inch male. (NSN: 4730-01-440-4615) (PN: 13229E7181). This fitting is located between the water storage tanks and the pump when the water storage tanks are employed in parallel.

(10) Tee Assembly, Quick Disconnect, 1-inch female, 1-inch male, 1-inch male. (NSN: 4730-01-440-4613) (PN: 13229E7174)

(11) Tee Assembly, Quick Disconnect, 1½-inch female, 1-inch female, 1½-inch male. (NSN: 4730-01-440-4931) (PN: 13230E5716).

(12) Tee Assembly, Quick Disconnect, 1-inch male, 1½-inch male, 1½ inch female (NSN: 4730-01-440-4933) (PN: 13230E5717).

(13) Tee Assembly, Reducing, 1-inch male, 1½-inch female, 1½-inch male. (NSN: 4730-01-440-4938) (PN: 13230E5715).

(14) Tee Assembly, Quick Disconnect, 1½ inch female, 1½ inch male, ¼ inch male (NSN: 4730-01-

487-3575). This fitting is used to connect the Hypochlorination Unit (NSN: 4610-01-435-4884) (PN: WAL-1031-96) to the primary water loop.

(15) Coupling Assembly, Quick Disconnect, 1-inch female, 1-inch female. (NSN: 4730-01-440-8569) (PN: 13229E7173). This is used either to connect two male ends of the hose loops or to connect the water lines to the Hamilton Sinks in the ISO containers.

(16) Plug, Quick Disconnect. (NSN 4730-01-415-6403) (PN: 13229E7170), sink adapter for the field sinks.

(17) Adapter, Straight Hose. (NSN: 4730-01-415-6420) (PN: 13229E7195), used with the Plug, Quick Disconnect (NSN 4730-01-415-6403) (PN: 13229E7170) to allow the connection of the adapter to the hose threads on the sink.

(18) Reducer, Quick Disconnect, 4-inch female, 2-inch male (NSN: 4730-01-064-0560) (PN: AA59326XI-1-9). This fitting is used on the supply side of the Water Tank, Fabric Collapsible, 5,000-gallon or Water Tank, Fabric Collapsible, 20,000.

(19) Reducer, Quick Disconnect, 2-inch female, 4-inch male (NSN: 4730-01-186-0821) (PN: AA59326XI-1-10). This fitting is used on the return side of the Water Tank, Fabric Collapsible, 5,000-gallon or Water Tank, Fabric Collapsible, 20,000.

(20) Adapter Assembly, Quick Disconnect, 4-inch female, 1½ inch male (NSN 4730-01-445-5188) (PN: 13229E7190).

(21) Reducer, Quick Disconnect, 1-inch female, 1½ inch male (NSN: 4730-01-499-8752) (PN: 3629). This fitting is used with the Heater, Water; 9,000 Watts (NSN: 4520-01-493-7423) (PN: 111739) for connect of the heater to the secondary water loop.

(22) Reducer, Quick Disconnect, 1½ inch female, 1-inch male (NSN: 4730-01-499-8687) (PN: 3630) for connect of the heater to the secondary water loop.

f. *Other Components*:

(1) Pipe Assembly, Potable Water (NSN: 4610-01-440-4086) (PN: 13229E7162). This vital component measures the water pressure in the distribution system. This gauge is placed at the end of the main loop. Its precise location depends on how the tanks are employed. **THE PRESSURE GAUGE IS FRAGILE.** When not in use, store it in the storage containers.

(2) Pipe Assembly, Potable Water. (NSN 4610-01-440-4088) (PN: 13229E7165). The water distribution system uses a flow meter that measures flow rates up to 100 GPM. It is placed at the end of the primary loop, immediately before the pressure gauge. **FLOW METERS ARE FRAGILE.** When not in use store them in the storage container.

(3) Case, Electrical-Electronic Test. (NSN: 6625-01-449-2857) (PN: 13229E7189). This case is used to store the pressure gauges and flow meters.

(4) Indicator Assembly. (NSN: 4610-01-440-6834) (PN: 13229E7163) This is an indicator assembly, sight liquid, to monitor water flow through the distribution system.

(5) Stand Assembly, Distribution Nozzle. (NSN 4930-01-120-7426) (PN: 13225E9140). This tripod style assembly is used to suspend the Nozzle Assembly, Water (NSN: 4610-01-440-6834).

(6) Nozzle Assembly, Water. (NSN: 4610-01-440-6834) (PN: 13229E7168) is provided to supply water to those parts of the hospital that is not connected t the water distribution system. Other used for this nozzle are outlined in the principles of installation section of this chapter.

(7) Strainer, Sediment. (NSN: 4730-01-440-7662) (PN: 13229E7180) This fitting is used to drain sediment in the distribution system.

(8) Pump Unit, Centrifugal (NSN: 4320-01-440-4421 or 4320-01-506-4459) Two pumps are supplied with the WDS, MF2K and the WDS, MRI 84-Bed; and three with the WDS, MRI 164-Bed distribution sets. These pumps come with quick-disconnect fittings, and are capable of producing a 65 GPM water flow through the system.

(9) Hypochlorination Unit, Water Purification. (NSN: 4610-01-435-4884) (PN: WAL 1031-96) This item of equipment is designed to chlorinate the water within the water distribution system to help prevent bacterial and fungal growth within the hoses of the system. It is also designed to provide the capability to flush the water lines with chlorine.

(10) Heater, Water, 9,000 Watts. (NSN: 4520-01-493-7423) (PN: 111739). This item of equipment is designed to raise the ambient temperature of the water in the potable water distribution lines to above freezing.

(11) Reel Assembly, Hose. (NSN: 4940-01-449-3850) (PN: 13229E7186-2) This rack was designed for the storage of hoses used in the older versions of the water distribution sets. This was ONLY for the storage of water distribution hoses (tan colored).

(12) Storage and Retrieval Materiel System. (NSN: 3990-01-449-1997) (PN: 13229E7185-1) A sister component to the Reel Assembly, Hose, this device was designed to store fittings in the older versions of the water distribution sets.

(13) Cage, Wire, Folding (NSN: 3990-01-505-5922). This cage is used in the new versions of the water distribution sets for the storage of hoses and fittings used in the distribution set.

1.3. Principles of Installation

The water distribution system is intended to be as flexible in its layout as the DEPMEDS hospital itself. **THERE IS NO ONE CORRECT WAY TO SET UP THE WATER DISTRIBUTION SYSTEM**. The number of possible configurations is almost unlimited. The information within the paragraph provides the basic guidelines necessary in planning the layout of the system for your hospital. Like other systems, the layout must be planned in advance. Obtain a copy of the hospital layout plan as soon as possible.

a. Location of the Water Storage Tank(s). Positioning the water storage tank(s) is the most important decision in setting up the water distribution system. There are a number of factors to consider:

(1) *Traffic Flow*. Trucks delivering water need access to the water storage tank(s).

(2) *Electric power.* The pump, water heater, and hypo-chlorination unit will sit next to the water tank(s), and the pump needs electric power. The electric cable on the pump, and water heater is 40 feet long.

(3) *Near the Primary Loop.* The water distribution system was designed for the primary loop to be near the highest concentration of ISO's.

(4) *Sufficient Area.* The water distribution system comes with one of several water tanks, dependent upon configuration:

Capacity	Length (ft)	Width (ft)
3,000	13.8	13.8
5,000	16.3	16.3
20,000	27.2	27.2

b. Location of the Primary Loop. The ISO's make up the largest number of water users in the hospital. They also use a large amount of water. For these reasons, the primary loop should make its circuit around the highest con-centration of ISO's. This approach also has the advantage of reducing the length of the primary loop, as well as reducing the amount of hose needed to connect the ISO's. The number of hospital components being used and their configuration dictates the length of the primary loop.

c. Secondary Loop(s). Secondary loops are normally installed instead of long one-way water lines. Water constantly moves in secondary loops. This greatly reduces the amount of stagnant water and the potential of bacterial growth. Flowing water stays cooler longer in the summer, and resists freezing in the winter.

d. Water Distribution Nozzles. Water distribution nozzles have several applications in the DEPMEDS hospital.

(1) An important application of the nozzle is to supply water to those parts of the hospital that are not connected to the water distribution system.

(2) The nozzle is an efficient way of filling the autoclaves. Place a nozzle with tripod near the CMS TEMPER. The hand valve on the nozzle is not very sensitive. For this reason, install a 1-inch female-male gate valve (PN: 13229E7167) in the line leading to the nozzle. Use the gate valve to adjust the flow to the nozzle, or else you will have every-where except in the autoclave. Locate the valve 20-feet or so away from the nozzle to enable you to move it without also moving the valve.

e. Crossing Pedestrian and Vehicle Routes. Hoses should not cross vehicle routes. Hoses crossing pedestrian paths should be kept to a minimum. If a hose must cross a TEMPER, do so at a corridor, and use a hose protection channel.

1.4. Assembly

a. This paragraph provides some general guidelines and a few hard rules on how to assembly the system. You should be able to determine the layout of the water distribution system based on the information in the previous paragraphs.

b. Assembly the water storage tank(s). Locate them using the information in paragraph 3a.

(1) 20,000 Gallon tank fittings installation.

(a) Supply Fittings

- Elbow 4” F x 4” M (is packed with the water tank)

- Hose assembly, nonmetallic 4” x 20’ (NSN 4720-01-140-6288, PN 13225E9136-4)

- Reducer, Quick Disconnect, 4" F x 2" M (NSN 4730-01-064-0560 PN AA59326XI-1-9)

- Valve, Gate, 2" F x 1 1/2" M (NSN 4820-01-440-8306, PN 13229E7178)

(b) Return Fittings

- Elbow, 4” M x 4” F (packed with water tank)

- Hose assembly, nonmetallic 4” x 20’ (NSN 4720-01-140-6288, PN 13225E9136-4)

- Reducer, Quick Disconnect, 2" F X 4" M (NSN 4730-01-186-0821, PN AA59326XI-1-10)

- Valve, Gate, 1 1/2" F x 2" M (NSN 4820-01-440-8302, PN 13229E7177)

(2) 5,000 Gallon tank fittings installation:

(a) Supply fitting:

- Valve, Gate (NSN 4820-01-440-8306, PN 13229E7178

(b) Return fitting:

- Valve, Gate (NSN 4820-01-440-8302, PN 13229E7177

(3) 3,000 Gallon tank fittings installation

(a) Supply fitting:

- Valve, Gate (NSN 4820-01-440-8306, PN 13229E7178

(c) Return fitting:

- Valve, Gate (NSN 4820-01-440-8302, PN 13229E7177

c. Attach the filter.

e. Connect the hose between the pump and the water tank.

f. Select an open sockets on an electrical distribution panel. Make sure the circuit is off. Plug the pump's and water heater's electrical plugs into the electrical sockets.

g. Lay the primary loop, following the guidance in proceeding paragraphs**. DO NOT CONNECT THE HOSES YET. DO NOT REMOVE THE CAPS OR PLUGS**.

Be aware of the requirements for fittings near the ISO walls that have water receptacles. Connections between hoses in the primary loop should occur near these points. Also be aware of other requirements for breaks in the loop, such as secondary loops, feeder lines to individual users, and nozzles to the CMS.

h. Lay the 1-inch hose for the feeder lines between the main loop and the ISO's. This process more clearly defines the need for breaks in the primary loop and for fittings.

(1) The CMS ISO has two water receptacles. All other ISO's have one water receptacle (except OR, which has none). Figure 1-1 shows the connection between the main loop and the CMS ISO. The Hose (item D) is optional; you can omit it, or use any length (other than 50 foot) needed. Place the gate valve next to the tee (item f). Placing the valve here enables you to disconnect an individual ISO without disrupting water supply to the rest of the hospital.

(2) Figures 1-2 and 1-3 show two different methods to make the connection between the main loop and an ISO with one water receptacle. The hose (item b, figure 1-3) is optional; you can omit it or put any length you need. Figure 1-3 shows the same configuration with the hose omitted. Do not omit the gate valve (item b, figure 1-3). It allows you to disconnect an individual ISO without disrupting the water supply to the rest of the hospital.

i. Lay the fittings and hose for the secondary loop(s). The beginning of each secondary loop is configured like that shown in Figure 1-4. The 1-inch gate valve here (item c) and at the end of the loop (item b, figure 1-5) allow you to shut off the water supply to the secondary loop without disrupting the water supply to the rest of the system. Always leave this valve open unless you are working on the secondary loop. To force water into the secondary loop, gradually close the 1-½ inch valve (item e) until the flow meter (item b) shows the flow between 5 and 10.

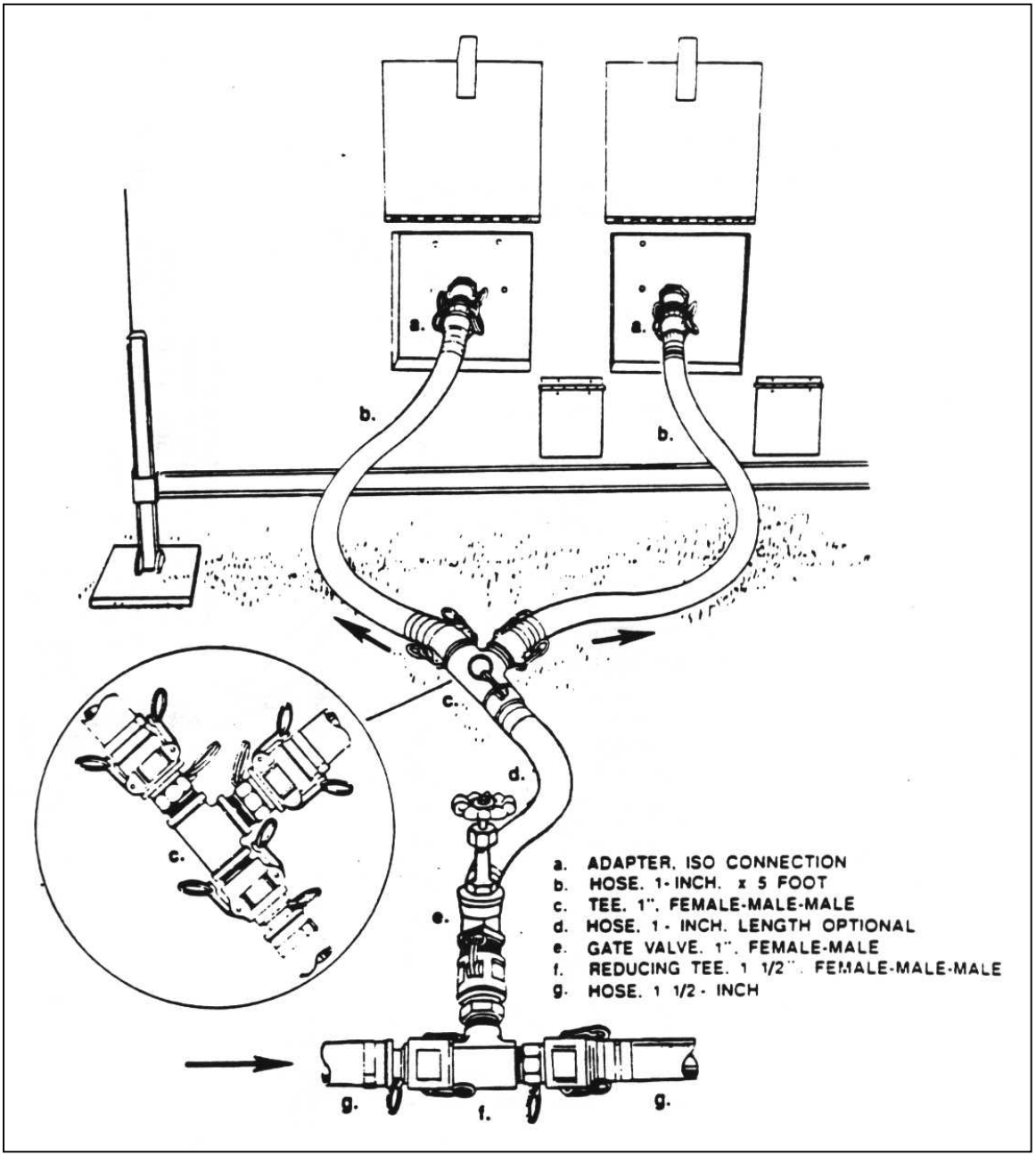


Figure 1-4
Water Hose Connection to the CMS ISO

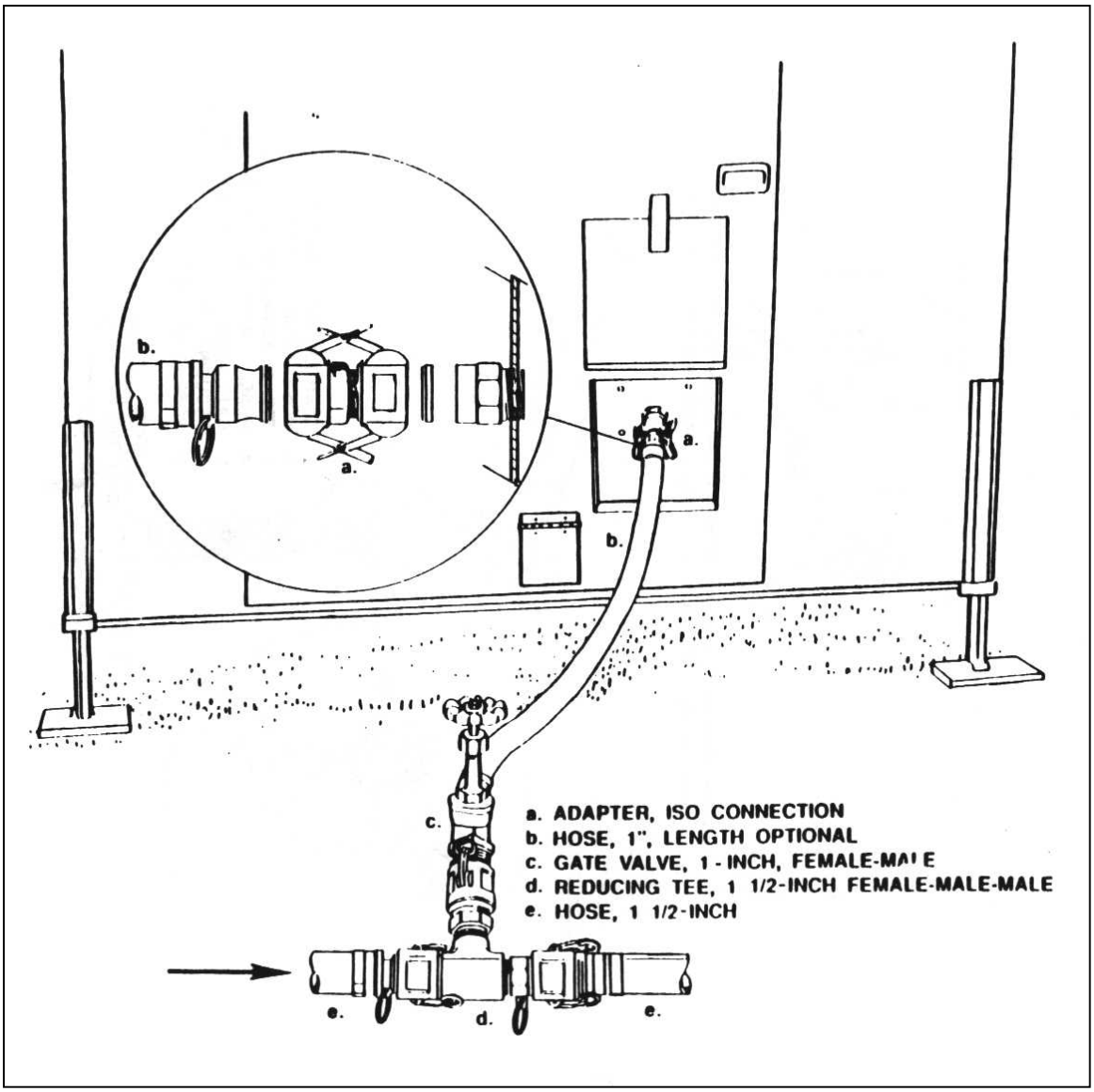


Figure 1-5
Connection to a Single Receptacle ISO (with hose)

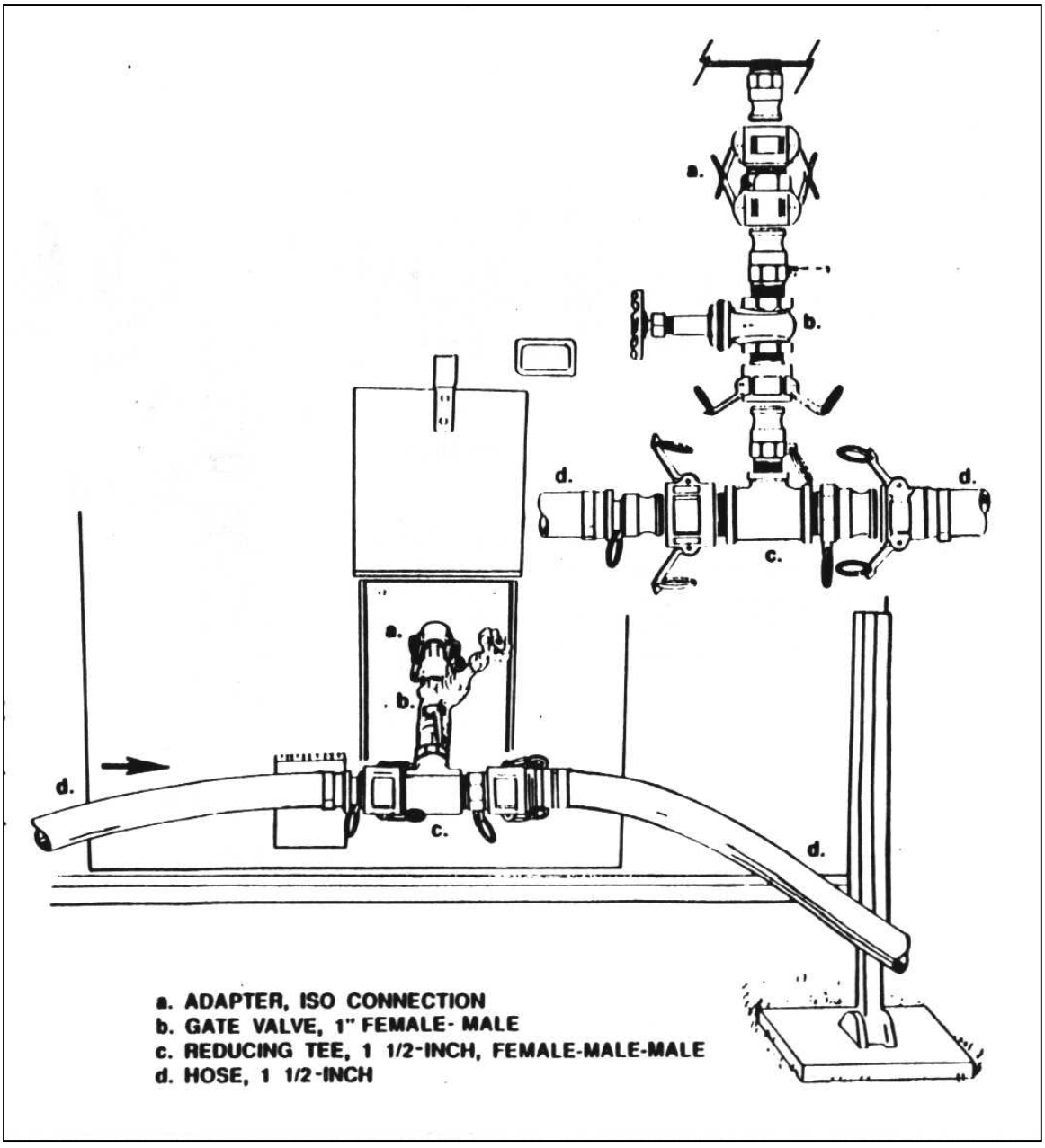


Figure 1-6
Connection to a Single Receptacle ISO (without hose)

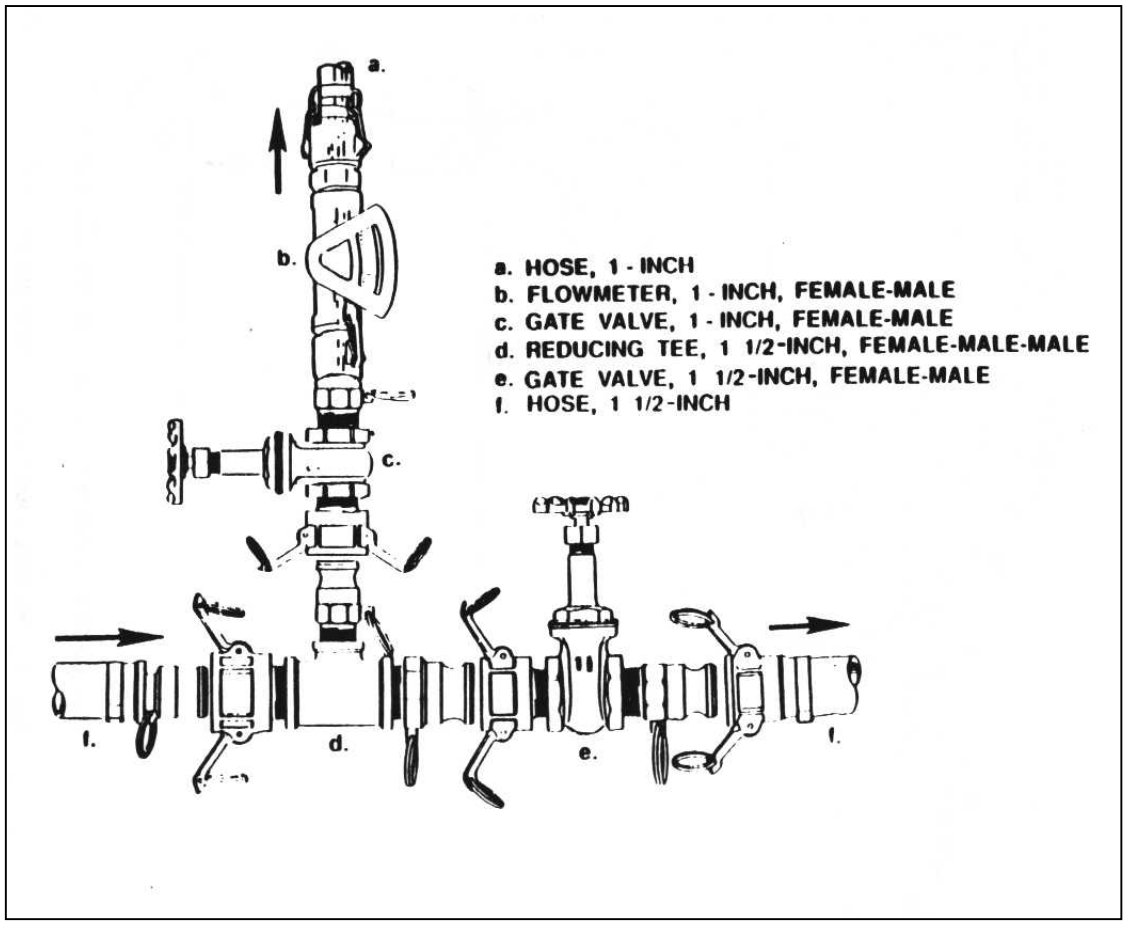


Figure 1-7
Fittings at the Start of a 1-Inch loop

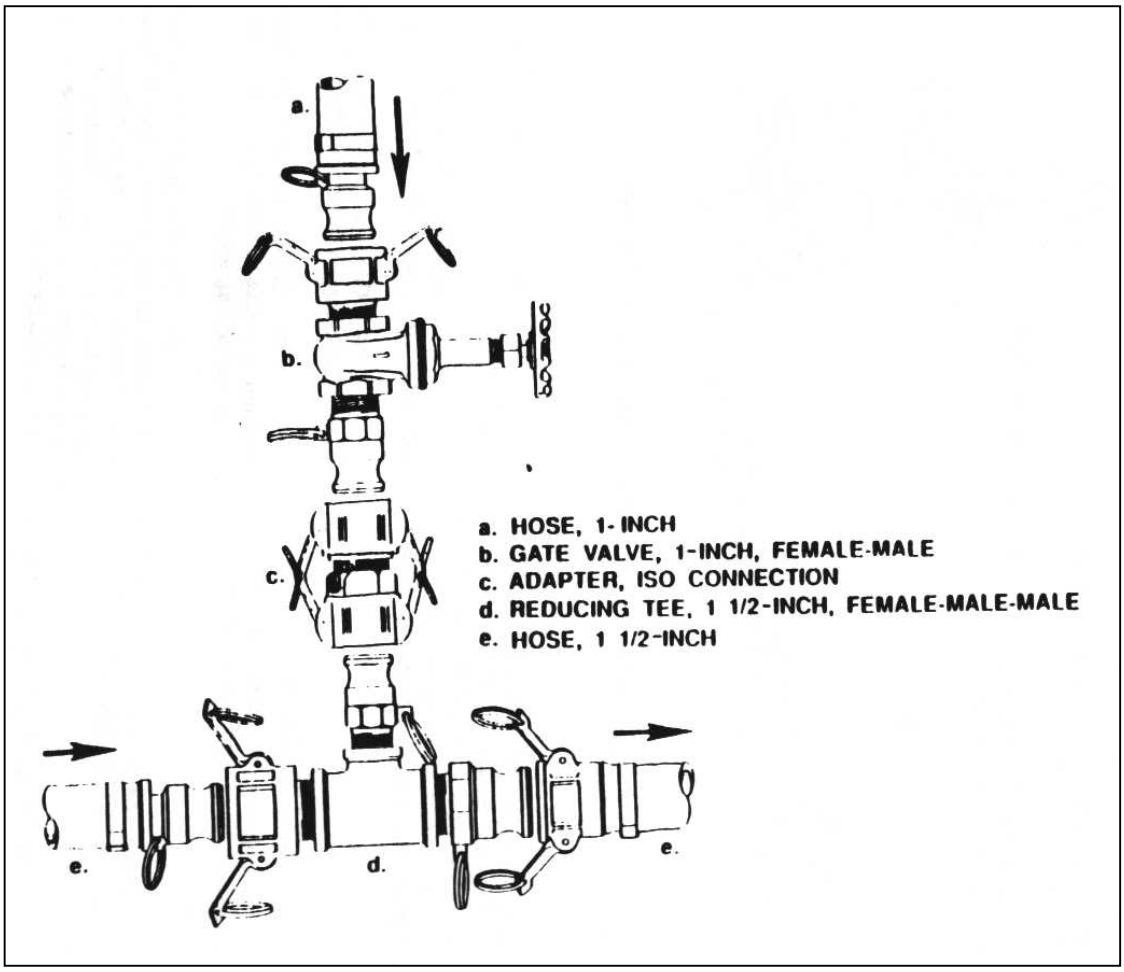


Figure 1-8
Fittings on Return Side of a 1-Inch loop

i. The return side of each secondary loop is configured like that shown in Figure 1-5. The gate valve (item b) is used with the 1-inch valve discussed in paragraph h, above. The female-female adapter (item c) is used to connect the male fitting on the secondary loop to the one on the reducing tee (item d) in the primary loop.

j. Lay the necessary fittings and hose to connect the field sinks. Figure 1-6 is a typical configuration. The hose (item d) is optional. You can omit it, or use any length hose you need. There are two possible connections to the field sink:

- Option 1 shows the connection from a 1-inch hose line.
- Option 2 shows the connection from a 1½ - inch loop.

k. Lay hose lines to the nozzle locations. Place one nozzle next to each CMS tent. These hose lines need enough slack so that the nozzle can reach each autoclave. Place the 1- inch gate valve far enough away from the nozzle so that when the nozzle and hose are moved, the gate valve is not dragged.

l. Use the hose protection channels for hose crossing TEMPER corridors. If conditions and time permit, you may bury the hose and the protective channel, but it is not necessary. Run the hose under the edge of the tent flap and both layers of floor. You may have to untie the floor tie-downs. Place the protection channel along the width of the corridor. **DO NOT PLACE A PROTECTION CHANNEL OVER A HOSE CONNECTION.**

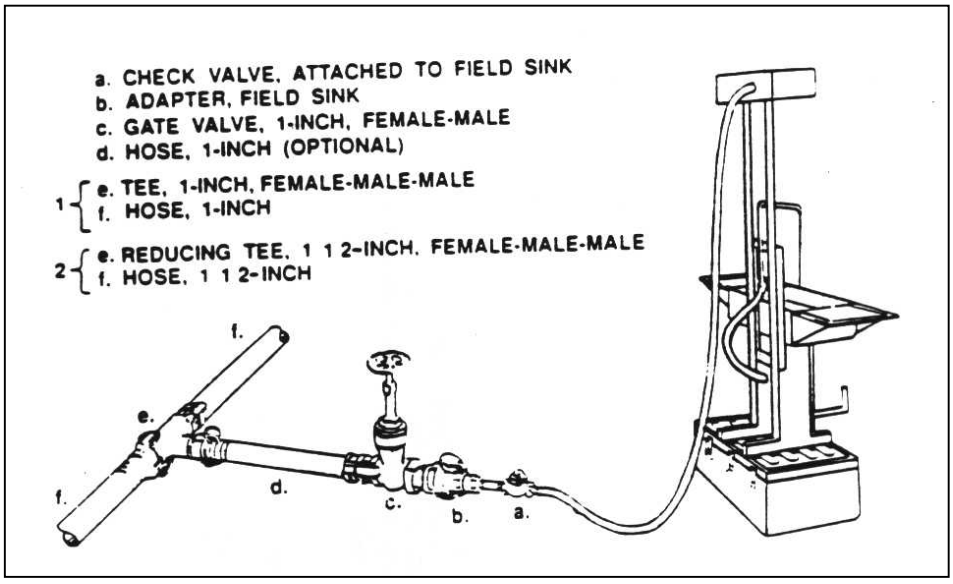


Figure 1-9
Field Sink Connections

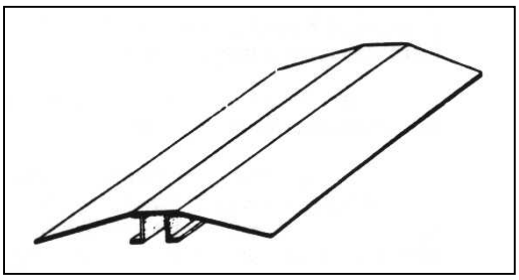


Figure 1-10
Channel, Hose Protector, Surface
(NSN 4720-01-440-4925)
(PN 13229E7176)

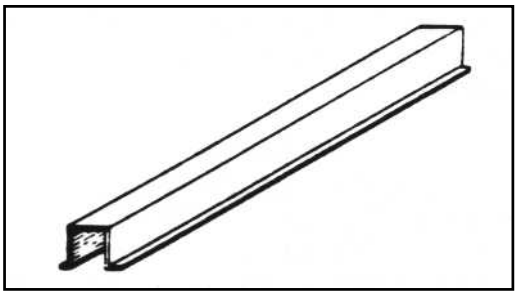


Figure 1-11
Channel, Hose Protector,
Subsurface
(NSN 4720-01-440-4928)
(PN 13229E7175)

CHAPTER 2

WATER DISTRIBUTION SET (WDS)
Medical Force 2000 (MF2K) 296 Bed Configuration
Medical Re-engineering Initiative (MRI) 264-Bed Configuration

OPERATOR AND REPAIR INSTRUCTIONS

2-1. Introduction

a. This chapter describes the assembly, operation, and disassembly of the Water Distribution Set (WDS) (MF2K, 296-Bed, and MRI, 264-Bed, Configurations).

b. The main reason for having a pressurized water distribution system is to control infection and communicable diseases in the hospital. The WDS accomplishes this by starting with covered water storage tanks, pressurizes the water with electric pumps, adds chlorine as necessary, and routes the potable water through a distribution system to designated areas of the hospital.

c. It is necessary that you coordinate early with Preventive Medicine personnel to inspect, take samples from, and analyze the water distribution system. Advise hospital personnel that the water from the system cannot be considered potable until certified by Preventive Medicine personnel.

2-2. Components.

a. *Cam-Lock Connections.* With two exceptions every connection in the water distribution system is connected to similar hoses by use of cam-lock fittings. The exception connects are the field sink adapter and the ISO adapter. Both connections are discussed later in this chapter. Cam-lock is a quick disconnection system that requires no special training or tools. There are no threads on the parts or hoses to be connected. To use cam-lock fittings, the dust cap or plug is removed from each hose end, then insert the male end fitting into the female end of the other fitting. Pull the levers back towards the hose to cam-lock the two parts together. There are some steps to be followed in making and breaking a hose connection. These steps are discussed later in this manual.

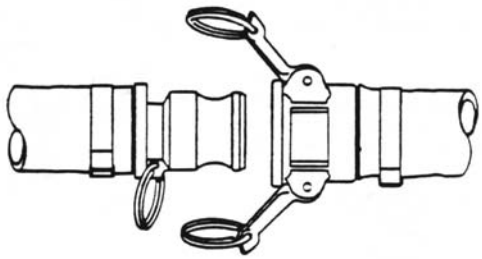


Figure 2-1
Cam-Lock Connection

Water Storage Tanks. Units are authorized the following types and quantities of water storage tanks.

Types

- LIN T12938 – Tank Fabric, Collapsible, 20,000 Gallon Capacity (NSN 5430-01-406-0507)

Figure 2-2
Tank Fabric Collapsible, 20,000 Gallon
Laid Out on Ground

- LIN T19033 – Tank, Fabric, Collapsible, 3,000 Gallon Capacity (NSN 5430-01-170-6984) This tank is packed in the Waste-Water Augmentation Set, Hospital, DEPMEDS (WWAS) (LIN: W49603) (NSN: 6545-01-435-6013) and is designed for use with the Medical Force 2000 (MF2K) configured Combat Support Hospital (CSH) 296 Bed for use in split-based operations. This Tank is being replaced by a Tank, Fabric Pillow, 3,000 Gallon Capacity (NSN: TBD) in versions 2 and 3 of the WDS. This change is being made to mitigate contamination of the water supply by debris entering the top of the "onion" style tank.

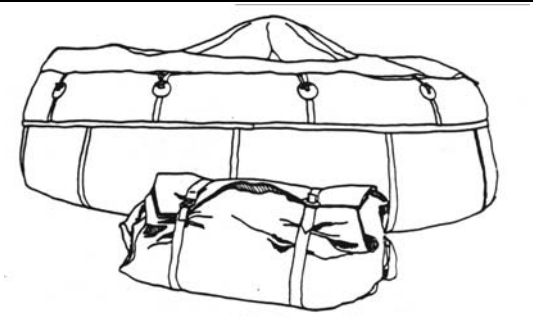


Figure 2-3
Tank Fabric, Collapsible, 3,000 Gallon

Picture to be Inserted

Figure 2-4
Tank Fabric, Collapsible, 3,000 Gallon

Requirements

	T12938	T19033
MF2K CSH	1	1
MRI CSH 164	1	0

b. *Water Pump.* The water pump used in this set is either NSN 4320-01-440-4421 or 4320-01-506-4459. Both have a 220 volt, 3-phase, totally enclosed, fan-cooled, electric motor. Each water pump is supplied with an integral power cord (40') that terminates in a male Class "L" power connector. The plug interfaces directly with the DEPMEDS electrical distribution system. Each pump is outfitted with a male and female, 1 1/2-inch cam-lock connection. There are two pumps in the WDS. One pump will serve the primary water distribution loop of the hospital, and the other is used to augment or maintain pressure through the secondary loops. For the MF2K configuration, a third pump is located in the Waste-Water Augmentation Set, Hospital, DEPMEDS (WWAS) (LIN: W49603) (NSN: 6545-01-435-6013). The third pump will be used in the event that a

Hospital Unit Base (HUB) and a Hospital Unit Surgical (HUS) operate independently.

CAUTION
Two persons are required to lift or carry a water pump.

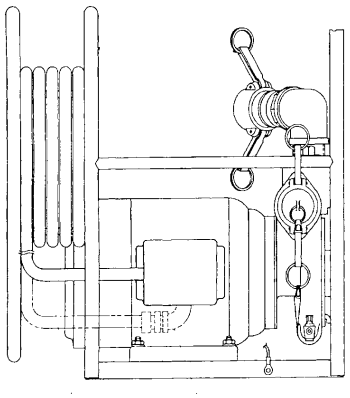


Figure 2-5
Pump Unit, Centrifugal, 65 GPM

c. *Hoses*. The hoses that are contained within the WDS are:

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8338)
PN: 13225E9136-14
5 feet in length, 1 inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-175-5958)
PN: 13225E9136-12
10 feet in length, 1 inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-177-3714)
PN: 13225E9136-13
20 feet in length, 1 inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8337)
PN: 13225E9136-15
50 feet in length, 1 inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8336)
PN: 13225E9136-17
5 feet in length, 1½ inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-7779)
PN: 13225E9135-9
10 feet in length, 1½ inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8343)
PN: 13225E9136-9
10 feet in length, 1½ inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8341)
PN: 13225E9136-10
20 feet in length, 1½ inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8335)
PN: 13225E9136-18
50 feet in length, 1½ inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-140-6288)
PN: 13225E9136-4
20 feet in length, 4-inch diameter

d. *Fittings and Valves.* There are numerous fittings and valves within the WDS. With two exceptions every fitting in the set has cam-lock connections.

(1) Reducer, 4-inch female, 2-inch male (NSN: 4730-01-064-0560) (PN: AA59326XI-1-9). This reducer is used on the supply side of the

Hose Assembly, Nonmetallic

Tank, Fabric, Collapsible 20,000-Gallon.

NOTE: Some valves and fitting descriptions are identified with the letter F for female and M for male connections.

(2) Reducer, 4-inch male, 2-inch female (NSN: 4730-01-186-0821) (PN: AA59326XI-1-10). This reducer is used on the return side of the Tank, Fabric, Collapsible 20,000-Gallon.

(3) Valve, Gate, 2-inch female, 1½ inch male (NSN 4820-01-440-8306) (PN: 13229E7178). This valve is attached to the male cam-lock of the Reducer, 4" F x 2" M (NSN: 4730-01-064-0560, PN: AA59326XI-1-9) which will be used on the Tank Assembly, Fabric Collapsible (20,000 gallon) (LIN: T12938, NSN: 5430-01-406-0507).

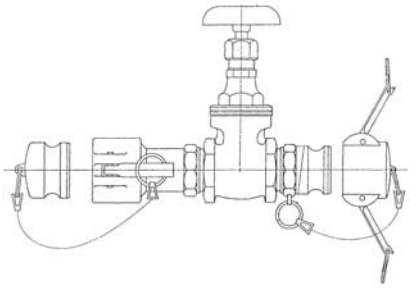


Figure 2-6
Valve, Gate, 1½ inch female, 2 inch male

(4) Valve, Gate,1½ inch female, 2-inch male (NSN: 4820-01-440-8302, PN: 13229E7177). This valve is attached to the female cam-lock of the Reducer, 4" M, 2" F (NSN: 4730-01-186-0821) (PN: AA59326XI-1-10) which will be used on the Tank Assembly, Fabric Collapsible (20,000 gallon) (LIN: T12938, NSN: 5430-01-406-0507).

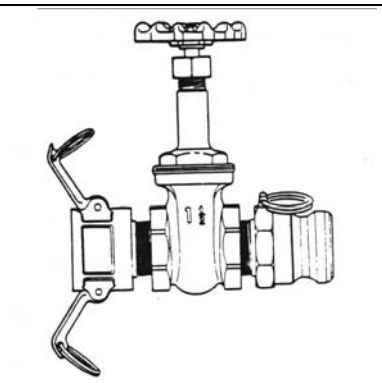


Figure 2-7
Valve, Gate, 1½ inch female, 2 inch male

(5) Valve, Globe, 1½ inch female, 1½ inch male (NSN: 4820-01-440-8765, PN: 13229E7169). This valve is attached to the 1½ inch loop, immediately after the beginning of a 1-inch loop. It is also used when multiple water tanks are arranged in parallel. In this application, the valve is manually adjusted to control the rate of flow in the system.

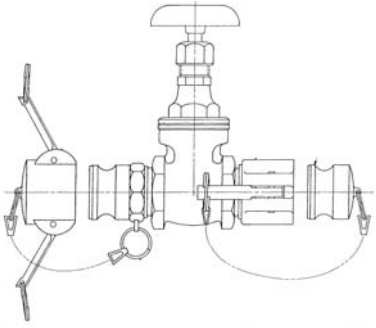


Figure 2-8
Valve, Globe, 1½ inch female, 1½ inch male

(6) Valve, Gate, 1 inch female, 1 inch male (NSN: 4820-01-440-7798, PN: 13229E7167). When used with individual water users,

such as field sinks and nozzles, this valve controls the rate of flow. It is also used at the beginning of secondary loops and long one-way water lines. Used this way, repairs or changes in the secondary loops can be made without interrupting water supply to the rest of the hospital.

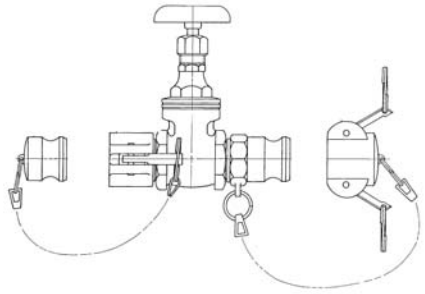


Figure 2-9
Valve, Gate, 1 inch female, 1 inch male

(7) Tee Assembly, Quick Disconnect, 1½" female x 1½" male x 1 inch male (NSN: 4730-01-440-4609, PN: 13229E7172). This fitting is used at each place where the one-way feeder lines branch off to the individual users, such as CMS, pharmacy, X-Ray, laboratory, etc. It is also used at the beginning and end of the secondary loop.

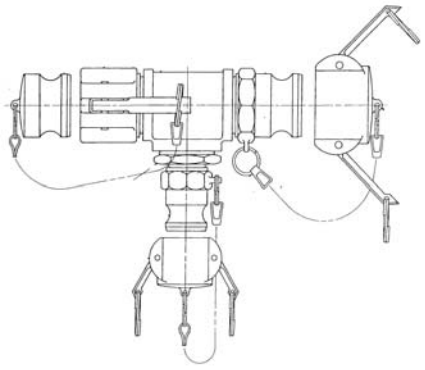


Figure 2-10
Tee Assembly, Quick Disconnect, 1½" female x 1½" male x 1 inch male

(8) Tee Assembly, Quick Disconnect, 1 inch female, 1 inch male, 1 inch male (NSN: 4730-01-440-4091, PN: 13229E0361). This fitting allows connection of the individual users along secondary loops or long one-way lines.

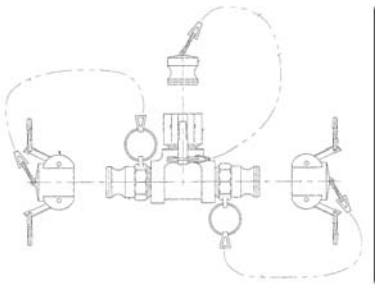


Figure 2-11
Tee Assembly, Quick Disconnect, 1 inch female, 1 inch male, 1 inch male

(9) Tee Assembly, Quick Disconnect, 1½ inch male, 1½ inch male, 1½ inch female (NSN: 4730-01-440-4633, PN: 13229E7182)(see figure A-10). This fitting is used on the return side of the primary loop.

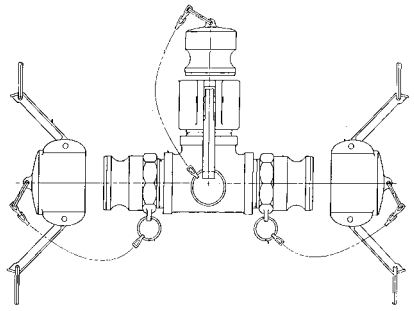


Figure 2-12
Tee Assembly, Quick Disconnect, 1½ inch male, 1½ inch male, 1½ inch female

(10) Tee Assembly, Quick Disconnect, 1½ inch female, 1½ inch female, 1½ inch male (NSN: 4730-01-440-4615, PN: 13229E7181). This fitting is located between the Tank Assembly, Fabric Collapsible (3,000 Gallon) (LIN: T19033, NSN: 5430-01-170-6984) and the Pump Unit, Centrifugal, 65 GPM [NSN 4320-01-440-4421] when two or more Tank Assembly, Fabric Collapsible (3,000 Gallon) are employed in parallel.

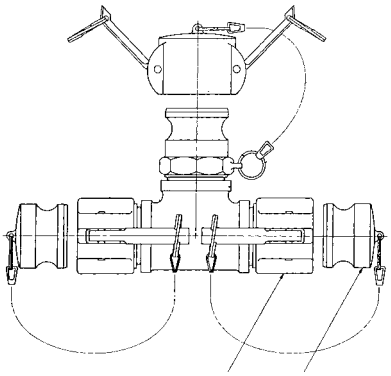


Figure 2-13
Tee Assembly, Quick Disconnect, 1½ inch female, 1½ inch female, 1½ inch male

(11) Tee Assembly, Quick Disconnect, 1½ inch female x 1½ inch male x 1 inch male (NSN: 4730-01-440-4613, PN: 13229E7174).

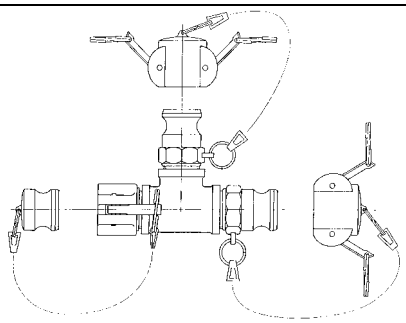


Figure 2-14
Tee Assembly, Quick Disconnect, 1½ inch female x 1½ inch male x 1-inch male

(12) Tee Assembly, Quick Disconnect, 1½ inch male x 1 inch female x 1½ inch female (NSN: 4730-01-440-4931, PN: 13230E5716).

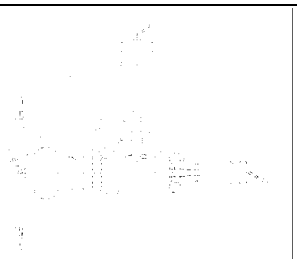


Figure 2-15
Tee Assembly, Quick Disconnect, 1½ inch male x 1 inch female x 1½ inch female

(13) Tee Assembly, Quick Disconnect, 1 inch male x 1½ inch male x 1½ inch female (NSN: 4730-01-440-4933, PN: 13230E5717).

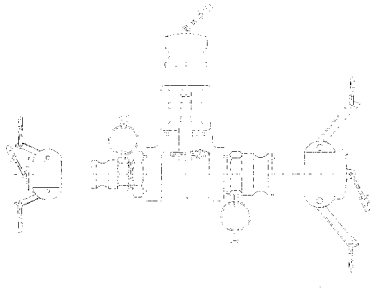


Figure 2-16
Tee Assembly, Quick Disconnect, 1 inch male x 1½ inch male x 1½ inch female

(14) Tee Assembly, Quick Disconnect, 1 inch male x 1½ inch female x 1½ inch male (NSN: 4730-01-440-4938, PN: 13230E5715).

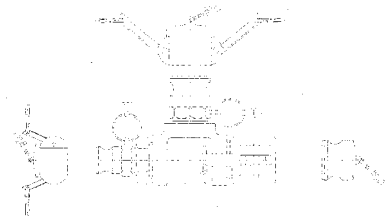


Figure 2-17
Tee Assembly, Quick Disconnect, 1-inch male x 1½ inch female x 1½ inch male

(15) Tee Assembly, Quick Disconnect, 1½ inch female, 1½ inch male x ¼ inch male (NSN: 4730-01-487-3575) is used to connect the Hypochlorination Unit (NSN: 4610-01-435-4884) (PN: WAL-1031-96) to the primary loop.

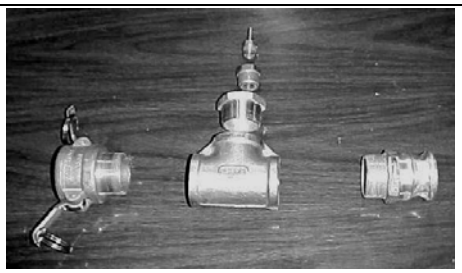


Figure 2-18
Tee Assembly, Quick Disconnect, 1½ inch female, 1½ inch male x ¼ inch male

(16) Coupling Assembly, Quick Disconnect, 1 inch female x 1 inch female (NSN: 4730-01-440-8569, PN: 13229E7173). This coupler is commonly referred to as a "Gender Changer". It is used when a male outlet is connected to a second male connection and as a connection on the Hamilton Sink connections for the ISO containers.

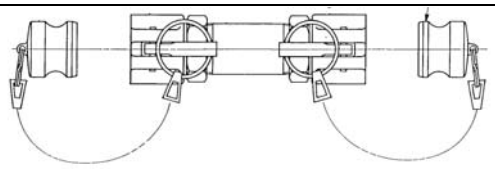


Figure 2-19
Coupling Assembly, Quick Disconnect, 1 inch female x 1 inch female

(17) Plug, Quick Disconnect (NSN: 4730-01-415-6403, PN: 13229E7170). This fitting is used in conjunction with Adapter, Straight Hose to Boss (NSN: 4730-01-415-6420, PN: 13229E7195) to connect field sinks to the water loop.

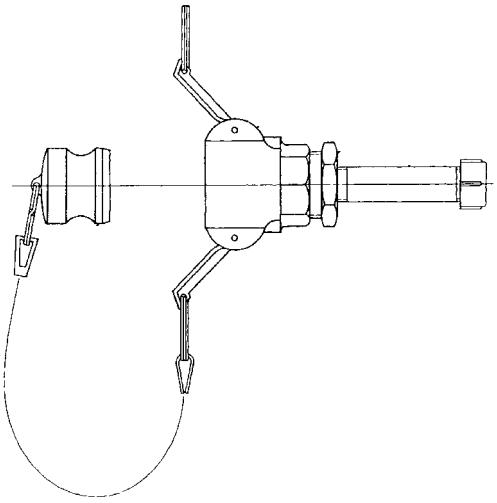


Figure 2-20
Plug, Quick Disconnect

(18) Adapter, Straight Hose to Boss (NSN: 4730-01-415-6420, PN: 13229E7195). This fitting is used in conjunction with Plug, Quick Disconnect (NSN: 4730-01-415-6403, PN: 13229E7170) to connect field sinks to the water loop. This is the first example where both connections are not cam-lock.

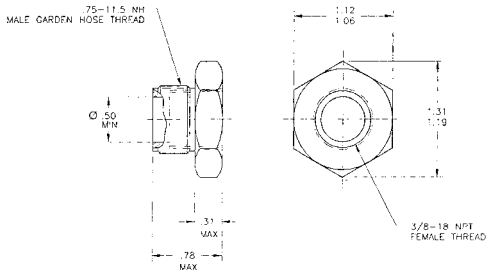


Figure 2-21
Adapter, Straight Hose to Boss

(19) Valve, Check (NSN 4820-01-440-5919, PN: 13229E7197) This valve is used to keep water in the potable hose line from reversing flow.

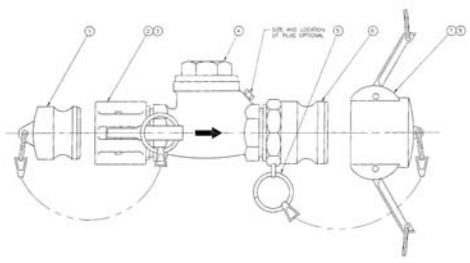


Figure 2-22
Valve, Check

(20) Adapter Assembly, Quick Disconnect, 4" female, 1½" male (NSN: 4730-01-445-5188) (PN: 13229E7190).

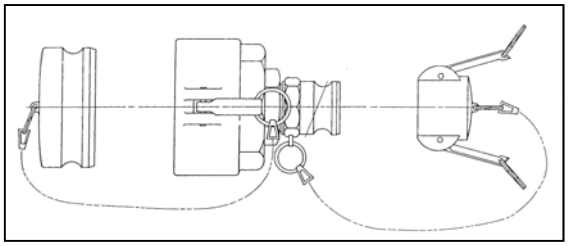


Figure 2-23
Adapter Assembly, Quick Disconnect

(21) Reducer Quick Disconnect, 1"F, 1½" M (NSN: 4730-01-499-8752) (PN: 3629). This fitting is used to connect the Heater, Water, 9,000 Watts (NSN: 4520-01-493-7423) (PN: 111739) to the secondary potable water distribution lines.

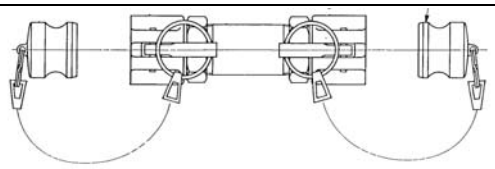


Figure 2-24
Reducer, Quick Disconnect
1-inch Female, 1½ inch Male

(22) Reducer Quick Disconnect, 1½"F, 1" M (NSN: 4730-01-499-8787) (PN: 3630). This fitting is used to connect the Heater, Water, 9,000 Watts (NSN: 4520-01-493-7423) (PN: 111739) to the secondary potable water distribution lines.

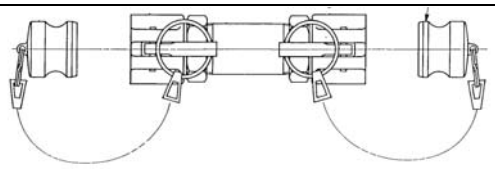


Figure 2-25
Reducer, Quick Disconnect
1½ inch Female, 1-inch Male

e. Other Components

(1) Pipe Assembly, Potable Water (NSN: 4610-01-440-4086, PN: 13229E7162). This component measures the water pressure in the distribution system. This gauge is generally placed at the return end of the main loop. Its precise location depends on how the tanks are employed. **THE PRESSURE GAUGE IS FRAGILE.** When not in use, store it in the Case Electrical-

Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

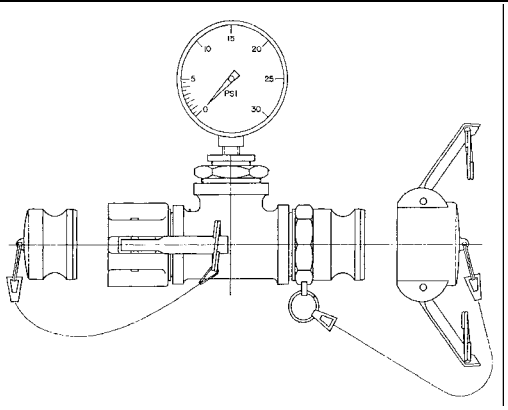


Figure 2-26
Pipe Assembly, Potable Water

(2) Pipe Assembly, Potable Water (NSN: 4610-01-440-4088, PN: 13229E7165). The water distribution system uses a flow meter that measures flow rates up to 100 GPM. It is placed at the end of the primary loop, immediately before the pressure gauge. **FLOW METERS ARE FRAGILE.** When not in use, store them in the Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

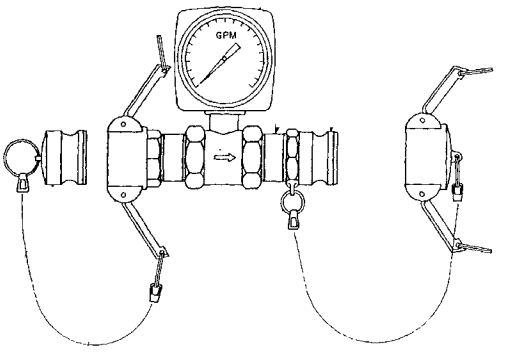


Figure 2-27
Pipe Assembly, Potable Water

(3) Indicator Assembly (NSN: 4610-01-440-4090, PN: 13229E7163). This assembly is used to monitor water flow through the distribution system. **THIS ASSEMBLY IS FRAGILE.** When not in use, store it in the Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

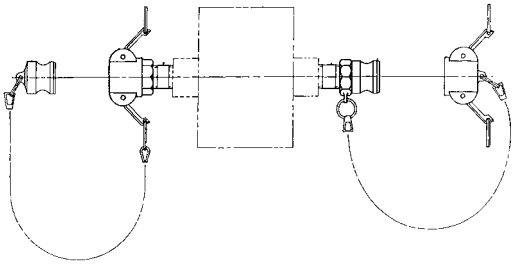


Figure 2-28
Indicator Assembly

(4) Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189). This case is used to store the pressure gauges, flow meters, indicator assembly and color comparator.

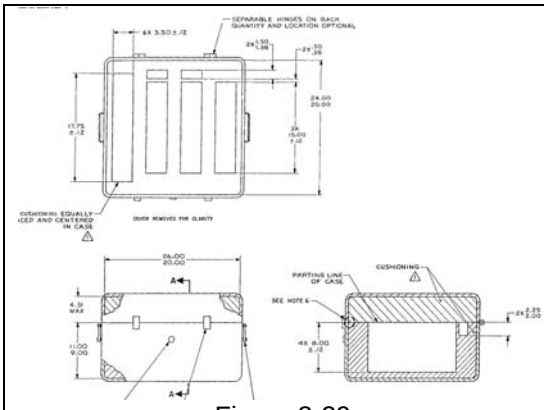


Figure 2-29
Case Electrical-Electronic Test

(5) Comparator, Color (NSN: 6630-01-044-0334, PN: U25377). The equipment operator to visually determine the turbidity of the supplied water uses the comparator.

(6) Stand Assembly,

Distribution Nozzle (NSN: 4930-01-120-7426, PN: 13225E9140). This assembly is used to suspend the Nozzle Assembly, Water (NSN: 4610-01-440-8834, PN: 13229E7168).

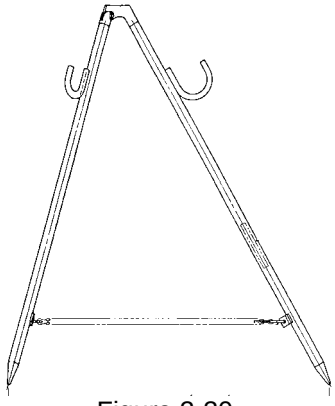


Figure 2-30
Stand Assembly, Distribution Nozzle

(7) Nozzle Assembly, Water (NSN: 4610-01-440-6834, PN: 13229E7168). The nozzle is provided to supply water to those parts of the hospital that are not connected to the water distribution system. Other uses for this nozzle are outlined in the principles of installation section of this chapter.

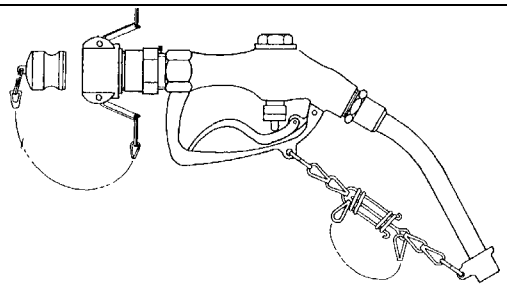


Figure 2-31
Nozzle Assembly, Water

(8) Strainer, Sediment (NSN: 4730-01-440-7662, PN: 13229E7179). This fitting is used to strain or remove large particles that could damage the water pumps in the water distribution system.

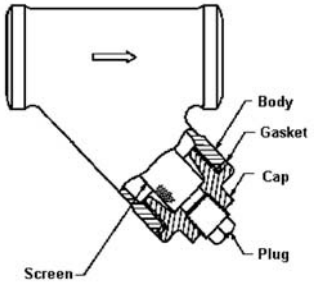


Figure 2-32
Strainer, Sediment

(9) Storage Devices. The Water Distribution Set, MF2K comes with two possible configurations of storage devices.

(a) The older configurations of the WDS comes with:

(1) Storage and Retrieval Materiel System (NSN: 3990-01-449-1997, PN: 13229E7185). This cage-like component is used to store set fittings. The rack is divided into four compartments. This assembly is moved in the same manner as the Reel Assembly. When full, this can weigh as much as 250 pounds. This item is replaced by the Cage, Wire, Folding (NSN: 3990-01-505-5922) in the newer configurations.

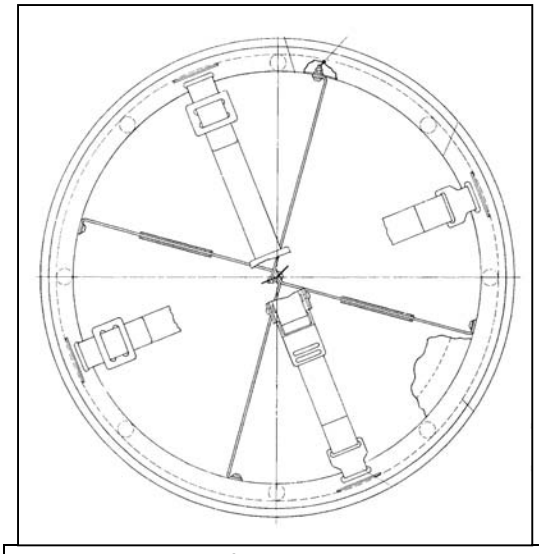


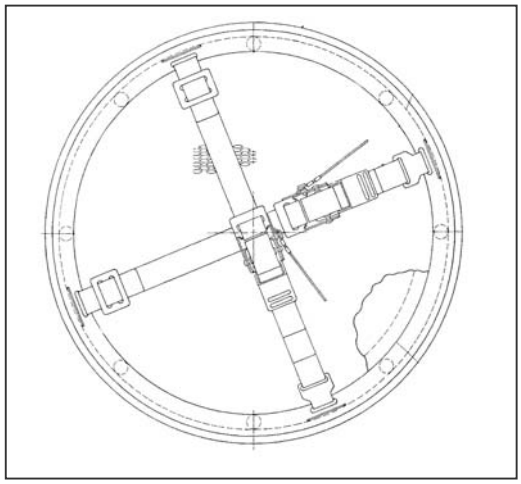
Figure 2-33
Storage and Retrieval Materiel System

CAUTION

When full, this storage and retrieval system can weigh up to 250 pounds and require at least five soldiers to lift it.

NOTE

One method of safely moving this item is to ensure that the cover is securely fastened, setting the item on its side, and rolling it.



(2) Reel Assembly, Hose (NSN: 4940-01-449-3840, PN: 13229E7186-1). This reel assembly is designed for the storage of hoses in the WDS. Store ONLY potable water hoses (tan colored) in these reels. This item is replaced by the Cage, Wire, Folding (NSN: 3990-01-505-5922) in the newer configurations.

Figure 2-34
Reel Assembly, Hose

CAUTION

When full, this storage and retrieval system can weigh up to 250 pounds and require at least five soldiers to lift it.

NOTE

One method of safely moving this item is to ensure that the cover is securely fastened, setting the item on its side, and rolling it.

(b) The newer configurations of this set come with Cage, Wire, Folding (NSN: 3990-01-505-5922). This cage is used for the storage of hoses and fittings used in the distribution set.

Figure 2-35
Cage, Wire, Folding

(10) Pump Unit, Centrifugal (either NSN: 4320-01-440-4421 or 4320-01-506-4459). The water pumps are supplied with the water distribution set. The water pumps are outfitted with quick-disconnect (cam-lock) fittings, and are rated at producing a 65 GPM water flow.

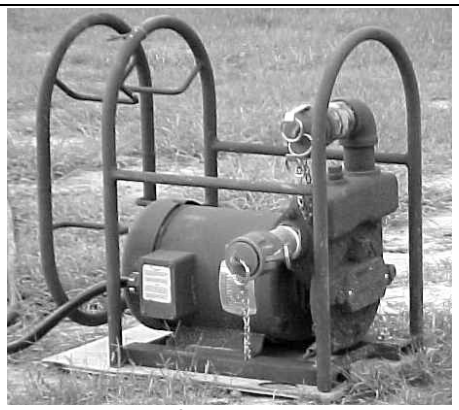


Figure 2-36
Pump Unit, Centrifugal

(11) Hypochlorination Unit (NSN: 4610-01-435-4884, PN: WAL 1031-96). This item is designed to treat and chlorinate the water within the water distribution system. The addition of chlorine based material to the water supply helps retard bacterial and fungal growth within the hoses. It is also designed to provide the capability to flush (hyper-chlorinate) the water lines.

Figure 2-37
Hypochlorination Unit

(12) Can, Water, Military (NSN: 7240-00-089-3827, PN: MIL-C-43613). This water can is provided for mixing the Sodium hypochlorite (NaOcl) for the Hypochlorination Unit.

(13) Heater, Water, 9,000 Watts (NSN: 4520-01-491-7423, PN: 111739). The, in-line water heater is provided for use of the system during cold weather operations. The heater is not intended to provide “hot” water, but raises the ambient temperature of the water in the hose lines by a few degrees to prevent freezing.

Figure 2-38
Heater, Water, 9,000 Watts

2-3 Principles of Installation

The water distribution set is intended to be as flexible in its layout as the DEPMEDS Combat Support Hospital itself. **THERE IS NO ONE "CORRECT WAY" TO SET UP THE WATER DISTRIBUTION SET.** The number of possible working configurations is almost unlimited. The information within this section provides the basic guidelines necessary for planning the layout for your hospital. Like other large footprint systems, the layout of the WDS must be planned in advance. Obtain a copy of the hospital layout as soon as possible, to determine the best locations (to ensure access to refill the tank(s)) for the major component, the water storage tank(s).

a. Location of Tank(s), Fabric Collapsible. Setting the tank(s) fabric, collapsible is the most important decision in setting up the water distribution set. There are a number of factors to consider.

(1) *Traffic Flow.* Trucks delivering water need access to the tank(s).

(2) *Electric Power.* The Pump Assembly, Centrifugal (NSN: 4320-01-440-4421), the Hypochlorination Unit (NSN: 4610-01-435-4884) and two Heaters, Water, 9,000 Watts (NSN 4520-01-493-7423) are placed near the tank(s) and they need electric power. The electric cables for pump assembly and heaters are 40 feet long.

(3) *Proximity of the Primary Loop.* The water distribution set is designed for the primary loop to be near the highest concentration of ISOs.

(4) *Sufficient Area.* The water distribution set comes with one Tank, Fabric Collapsible, 20,000 gallon. Each of these tanks is 27.2 feet long and 27.2 feet wide.

c. Location of the Primary Loop. The ISOs make up the largest number of water users in the hospital. As such, they use a large amount of water. Fore this reason, the primary loop should make its circuit around the highest concentration of ISOs. This approach also has the advantage of reducing the length of the primary loop, as well as reducing the amount of hose needed to connect the ISOs. The number of hospital components being used, and their configuration dictates the length of the primary loop.

d. Secondary Loop(s)
Secondary loops are normally installed instead of long one-way water lines. Water constantly moves in the secondary loops. This greatly reduces the amount of stagnant water, and the potential of bacterial and fungal growth. Flowing water stays cooler longer in summer, and resists freezing in winter.

e. Water Distribution Nozzles.
The Nozzle Assemblies, Water, (NSN: 4610-01-440-6834) have several applications in the DEPMEDS, Combat Support Hospital.

(1) An important application of the nozzle assembly is to supply water to those areas of the hospital that are not connected to the water distribution set.

(2) The nozzle assembly is an efficient way of filling the autoclaves. Locate a nozzle, with Stand Assembly, Distribution Nozzle (NSN: 4930-01-120-7426) in the vicinity of the Central Materiel Supply (CMS) TEMPER. The hand valve of the nozzle is not very sensitive to small adjustments and tends to give large quantities of water. For this reason you should install a 1 inch female-male Valve, Gate (NSN: 4820-01-440-7798, PN: 13229E7167) in the line leading to the nozzle assembly. Set the gate valve volume to reduce or adjust the flow of the water at the nozzle assembly. Adding this control feature should be at any location where excessive water is a potential problem. Locate the valve 20 feet or so away from the nozzle assembly to enable you to adjust overall flow without moving the valve.

f. Pedestrian and Vehicle Routes. Hoses should not cross vehicle routes. Hoses in pedestrian paths should be kept to a minimum. If a hose must cross a TEMPER, do so in a corridor, and use a Channel, Hose Protector (NSN: 4720-01-440-4925 PN: 13229E7176 or NSN: 4720-01-440-4928 PN: 13229E7175) (Both of these types of channel protectors are contained in the Waste-Water Augmentation Set, Hospital, MF2K.

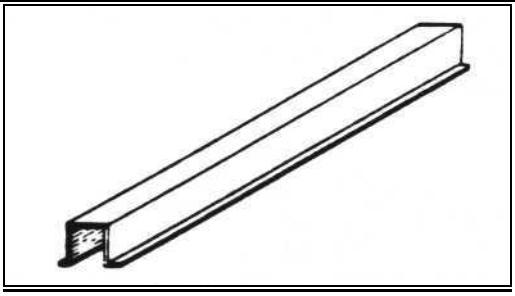


Figure 2-39
Channel, Hose Protector
NSN: 4720-01-440-4925

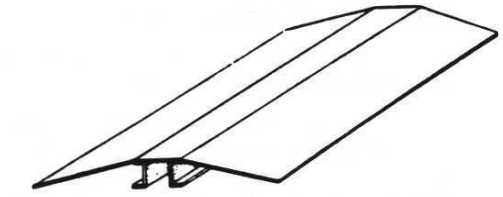


Figure 2-40
Channel, Hose Protector
NSN: 4720-01-440-4928

g. Location of In-Line Water Heaters. The in-line water heaters, supplied with this set are designed to keep the ambient temperature of the water within the hoses and bladders above freezing. The system is designed to have 4 heaters per primary loop, and 4 heaters per secondary loop. They come with cam-lock, quick disconnect fittings, and can be placed a various locations along the loop run. When planning on your setup, remember that these heaters require 208 Volts, AC electrical power and consequently must be located within 40 feet of a power distribution center (PDC). Also, the heaters should be placed as equally as possible along each loop.

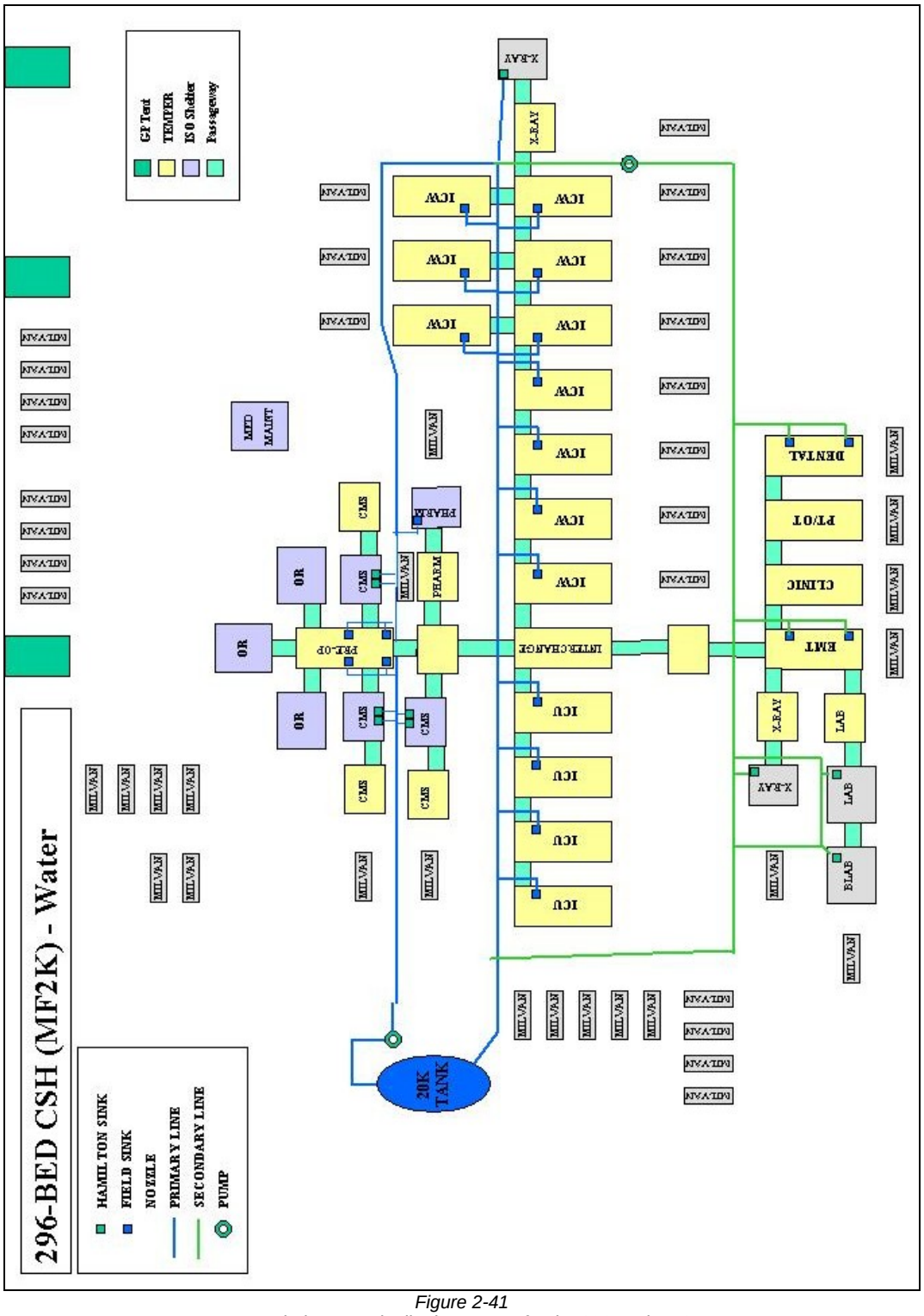


Figure 2-41
*Recommended Water Distribution Layout for the 296-Bed MF2K*CSH

2-4. Assembly. This section provides general guidance and some hard rules on how to assembly the water distribution set. Prior to assembly of the WDS, you should determine the layout of the water distribution set based on the information of previous paragraphs, and the Commander's desired hospital layout. It is helpful to sketch the layout of the water distribution set over the layout diagram of the hospital.

a. Assemble the tank(s) fabric, collapsible, 20,000 Gallon. Locate them using the information in paragraph 2-3a.

(1) Attach one Hose Assembly, Nonmetallic [4" x 20 feet] (NSN: 4720-01-140-6288) to the outlet port of the tank and one Hose Assembly, Nonmetallic [4" x 20 feet] (NSN: 4720-01-140-6288) to the inlet port of the tank.

(2) Attach the Reducer, Quick Disconnect [4 inch female x 2 inch male] (NSN: 4730-01-064-0560) to the Hose Assembly, Nonmetallic [4" x 20 feet] (NSN: 4720-01-140-6288) on the outlet port of the tank

(3) Attach the Reducer, Quick Disconnect [4 inch male x 2 inch female] (NSN: 4730-01-186-0821) to the Hose Assembly, Nonmetallic [4" x 20

feet] (NSN: 4720-01-140-6288) on the inlet port of the tank

(4) Attach the Valve, Gate [2 inch female x 1½ inch male] (NSN: 4820-01-440-8306) to the Reducer, Quick Disconnect [4 inch female x 2 inch male] (NSN: 4730-01-064-0560) on the outlet port of the tank. **(MAKE SURE THE VALVE IS TURNED OFF.)**

(5) Attach the Valve, Gate [1½ inch female x 2 inch male] (NSN: 4820-01-440-8302) Reducer, Quick Disconnect [4 inch male x 2 inch female] (NSN: 4730-01-186-0821) on the inlet port of the tank. **(MAKE SURE THE VALVE IS TURNED OFF.)**

b. Attach the filter assembly. The location of the filter assembly depends on the configuration of the tanks. But, it should be located between the outlet port of the tank and the Pump Assembly, Centrifugal.

c. Connect the suction hose (1½ inch x 10 feet) between the pump and the assembly for the outlet port of the tank and the pump.

d. Select open 40-60 Ampere female connections on the power distribution panel (PDC). **MAKE SURE THE CIRCUIT BREAKER ON THE PDC IS OFF**. Connect the water pump's and the heaters' electrical plugs to the selected receptacles on the PDC.

NOTE
Do not power any pump until the water system is connected.

NOTE

Do not turn on the heaters until the water system is connected, and water is being pumped.

e. Lay the primary loop following the guidance in paragraph 2-3c. **DO NOT CONNECT ANY HOSES AT THIS TIME. DO NOT REMOVE THE CAPS OR PLUGS.** Be aware of the requirement of fittings near the ISO Container walls that have water receptacles. Connections between hoses in the primary loop should occur near these points. Also be aware of other requirements for breaks in the loop, such as secondary loops, feeder lines to individual users, nozzles to CMS, and inclusion of the Heater, Water, 9,000 Watts at various points in the primary and secondary loop(s).

f. Lay the 1 inch hose for the feeder lines between the main loop and the ISOs. This process more clearly defines the needs for breaks in the primary loop and for fittings. The CMS ISO has two water receptacles. All other ISOs have one water receptacle (except for OR, which has none) Place a 1 inch gate valve (NSN: 4820-01-440-7798) next to the tee assembly (NSN: 4730-01-440-4609). Placing the valve here enables you to disconnect an individual ISO without disrupting water supply to the rest of the hospital.

g. Lay the fittings and hose for the secondary loop(s). The beginning of each secondary loop of each secondary loop is configured

h. The return side of each secondary loop is configured like that shown in Figure

i. Lay the necessary fittings and hose to connect the field sinks.

j. Lay hose lines to the nozzle locations. Place one nozzle next to each CMS tent. These hose lines need enough slack so that the nozzle can reach each autoclave. Place the 1-inch gate valve far enough away from the nozzle so that when the nozzle and hose are moved, the gate valve is not dragged.

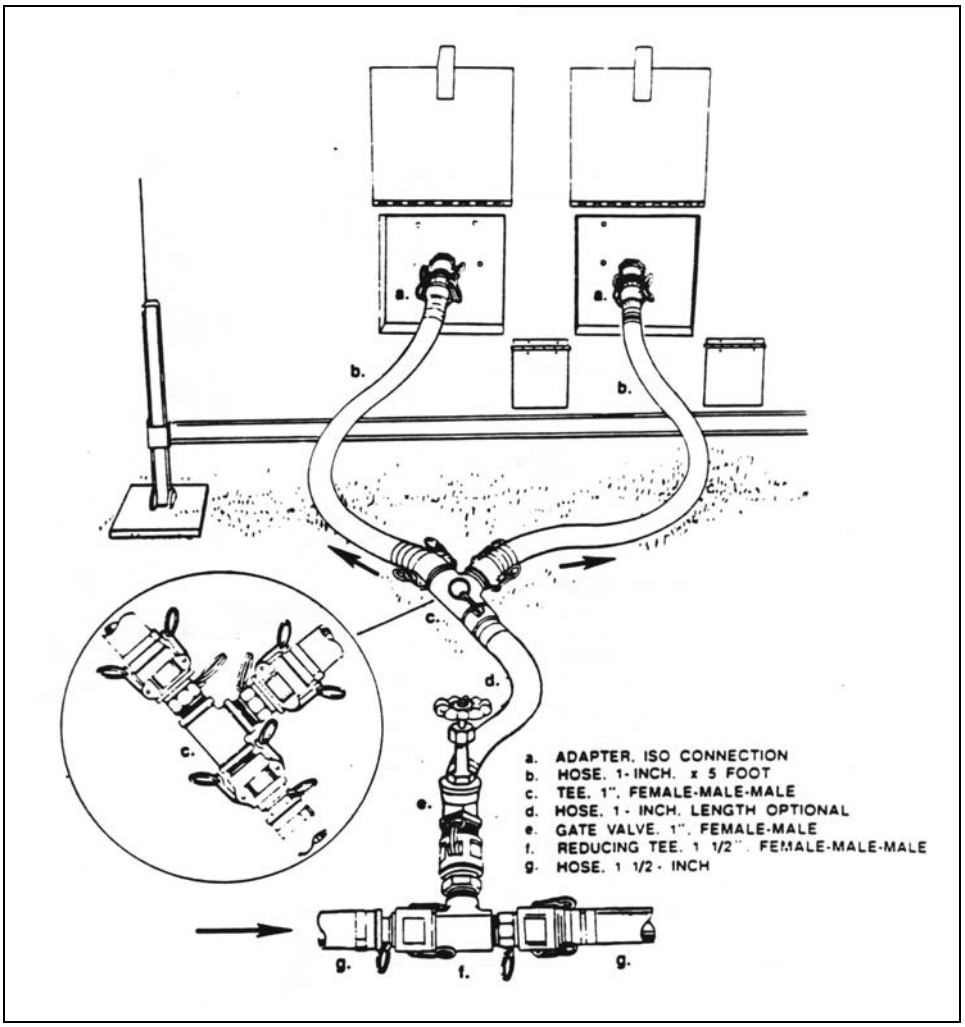

a. ADAPTER, ISO CONNECTION
b. HOSE, 1-INCH, x 5 FOOT
c. TEE, 1", FEMALE-MALE-MALE
d. HOSE, 1-INCH, LENGTH OPTIONAL
e. GATE VALVE, 1", FEMALE-MALE
f. REDUCING TEE, 1 1/2" FEMALE-MALE-MALE
g. HOSE, 1 1/2-INCH

Figure 2-42
Water Hose Connection to the CMS ISO

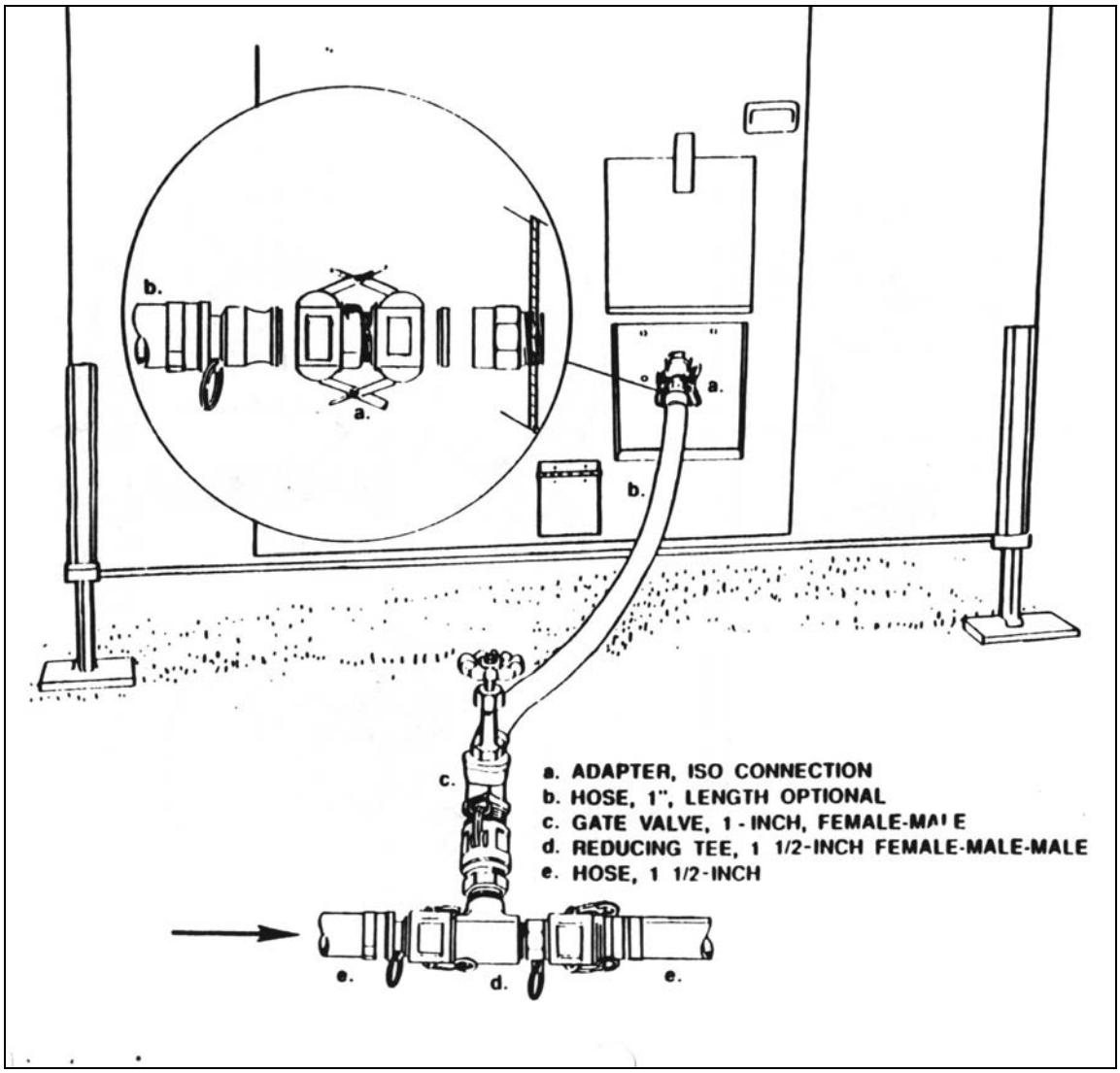


Figure 2-43
Connection to a Single Receptacle ISO (with hose)

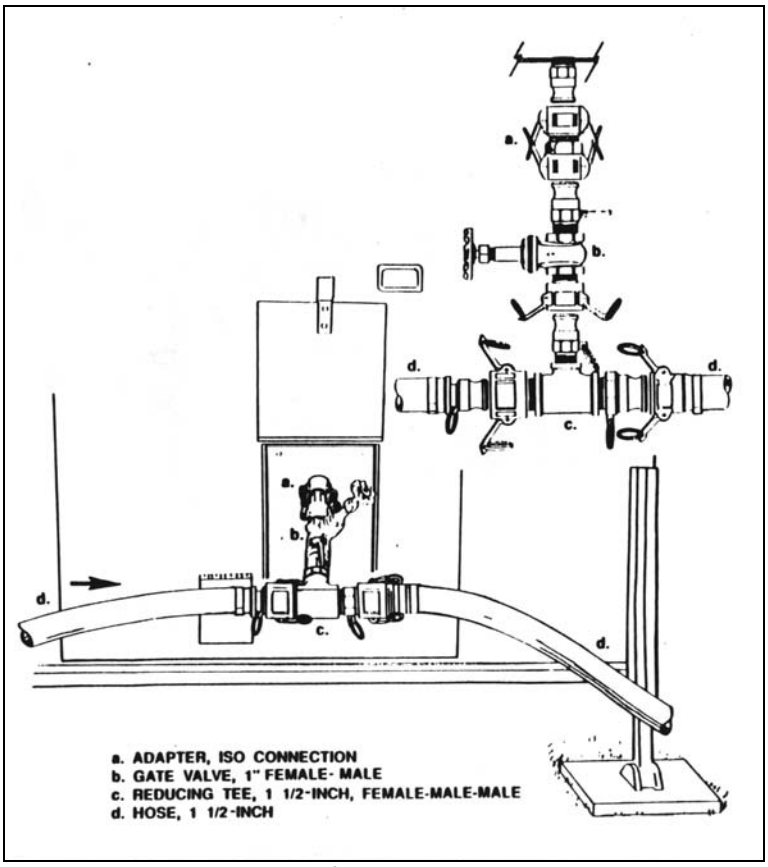


Figure 2-44
Connection to a Single Receptacle ISO (with hose)

k. Use the hose protection channels for hose that will cross TEMPER corridors. If conditions and time permit you may bury the hose and the channel protector, but it is not necessary. Run the hose under the edge of the tent flap and both layers of the floor. You may need to untie the floor tie-downs. Place the protective channel over a hose connection.

l. With the system laid out prepare for the assembly. Correct assembly of the hoses and cam-lock fittings is easier if the fittings are clean. Dirty or mud-encrusted connections must be cleaned off prior to assembly. It is absolutely essential to avoid contaminating the inside of the hoses and fittings. Follow the procedure below as closely as possible.

CAUTION
Correct assembly of connections is essential to avoid contaminating the system.

(1) Open the locking levers for both cam-lock connectors. **DO NOT REMOVE THE FEMALE DUST CAP OR MALE DUST PLUG.**

(2) Place the female connector on an elevated surface (such as the toe of your boot), that allows the opening of the fitting to be

face up, or off the ground. This procedure, which applies to all connections, reduces the chance of contaminants entering the fitting.

(3) Lay the male fitting across the female fitting.

(4) Remove the dust plug from the female fitting.

(5) Holding the dust plug in your hand; remove the dust cap from the male fitting.

(6) Connect the dust plug and dust cap to each other. Close the locking levers and lay them on the ground.

(7) Connect the male and female hose connectors or valve fittings without allowing the fittings to touch the ground. Close the locking levers.

(8) If you find dirty connections during the assembly process, ensure that they are cleaned prior to assembly.

(9) Use this procedure to make all the connections in the system. One exception is the connection at the ISO.

The male fitting on the ISO does not have a dust cap. Because of this, the dust plug from the female-female adapter will not have a matching connection.

Final checks to be done **BEFORE TURNING ON THE WATER.**

(1) Open all gate valves in the primary and secondary loop(s), and to the nozzles and ISOs.

(2) Close all valves to the field sinks.

(3) Close the globe valves on the Interior wall panel of the ISO. Ensure the Hamilton sinks are ready by closing the:

(a) Drain cock on the pump.

(b) Valve at the top of the pump body.

(c) Heater drain valve.

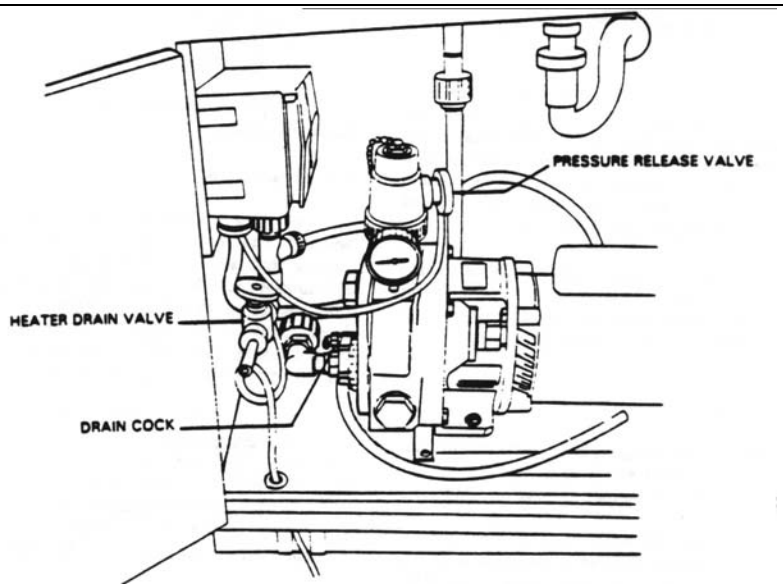


Figure 2-45
Hamilton Sink Connection

(4) Make sure that the field sinks are ready. Instruct users of the field sinks connected to the system to set them up for gravity operation in accordance with the manufacturer's literature.

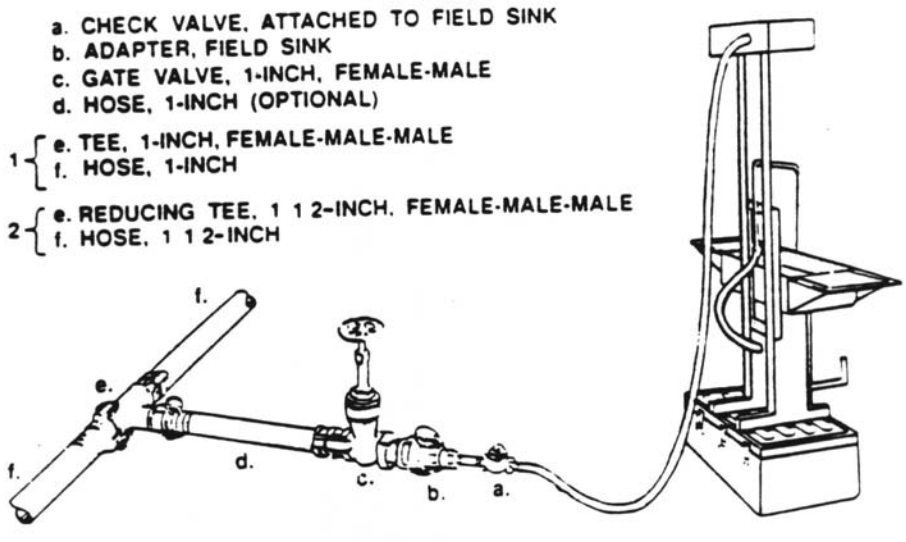


Figure 2-46
Field Sink Connection

(5) With water in the storage tank(s) and all of the connections made:

(a) Open the valve on the storage tank immediately before the pump.

(b) Remove the nut at the top of the pump assembly body. Refer to TM 5-4320-274-14&P. With a water tank full of water, the pump will prime itself. Removing the nut allows air to escape: water fills the pump body. Once water has reached the nut opening, replace the nut and tighten firmly.

(c) Open the gate valve at the return side of the water tank. If you are using more than one tank, open the valves between the tanks.

(d) Turn on the circuit for the pump.

(e) Turn on the circuit for the Hypochlorinator.

(f) Turn on the circuits for the in-line water heaters.

l. Adjust the rate of flow at the return side of the distribution system. Adjust the rate of flow with the gate valve so that the pressure gauge reads between 8 and 12 pounds per square inch (psi).

m. Adjust the flow at the secondary loop(s). The presence of water in the secondary loop(s) does not mean that water is flowing through the loop(s). To ensure water is flowing, gradually close the 1½ inch gate valve. Continue closing the valve until the flowmeter reads between 5 and 10 gallons per minute.

n. Return to the gate vale by the pressure gauge. After adjusting the flow for the secondary loop(s), the flow rate here may need to be adjusted. Use the gate valve to adjust the rate of flow until the pressure gauge reads between 8 and 12 psi.

o. Go to each Hamilton sink. Instruct the users to double-check that the sinks are ready. Have them open the globe valve on the ISO wall. Turn on the water. The initial water from the faucet may appear rusty. This is rust that was on the inside of the body of the pump in the Hamilton sink. Allow the water to run until the water clears.

p. Go to each field sink connected in the water distribution system. Instruct the users to open the gate valve, but not all the way. If there are any leaks anywhere but at the threaded fittings, defer the sink to maintenance. Users can correct leaks at the fittings by tightening them with a pair of pliers. It is up to the user to adjust the rate of flow to the sink with the gate valve.

q. Before the water is used, direct the field sanitation team to test the chlorine in the water storage tank(s). Then operate **EVERY** sink in the system for three to five minutes. Operate each nozzle for one minute. This flushes the system of potential

contaminants that may have entered the hoses and fittings since last use.

r. Coordinate with preventive medicine personnel to inspect the system and take water samples. Coordinate also with regular preventive medicine for regular inspections and sampling.

2-5. Operation

The purpose of this paragraph is to ensure that the equipment is operated safely and that the system provides a continuous supply of potable water.

a. Monitor the water supply. Turn off the pump when the depth of water in the water tank is less than 8 inches. The bearings in the water pump will burn out if the pump impeller is not covered with water.

b. The field sanitation team should monitor the chlorine residual in the water supply. Measure chlorine residual at the water tank(s), and 20 percent (20%) of the sinks and nozzles in the distribution system daily. A chlorine residual is essential for preventing biological contamination. However, too high a chlorine residual will make the water taste bad.

c. Remove and clean the filter in the filter assembly daily. This requires shutting down the pumps, hypochlorinator and heaters. In order to minimize downtime, have a clean filter ready for immediate installation. Follow the procedure below to change the filter.

(1) Turn off power to the heaters.

(2) Turn of power to the hypochlorinator.

(3) Turn off the power to the pumps.

(4) Close the gate valve by the filter assembly.

(5) Change filters in the filter assembly.

(6) Open the gate valve.

(7) Prime the pump.

(8) Turn on the power to the pump.

(9) Turn on power to the hypochlorinator.

(10) Turn on power the power to the heaters.

(11) Clean the old filter and place it in the storage container.

2-6. Disassembly.

a. The procedures discussed here will enable you to disassemble the system in a manner that is efficient and minimizes the chance of contamination. The procedure is intended to be independent of any other actions associated with the disassembly of the hospital. However, hose lines located inside a TEMPER must be removed before the tent can be disassembled.

b. Disconnecting the cam -lock fittings is **not** the first thing done in disassembly. However, it is the most frequent task and warrants being discussed first. This procedure is not the reverse of the assembly process previously discussed. The intent is the same though; disconnect with minimal risk of contaminating the system.

(1) Unlock all four locking levers.

(2) Separate the fittings. Rest the female fitting on a protective surface (**NOT ON THE GROUND)** with its opening up. The toe of your boot will work.

(3) Lay the male fitting on the female fitting (or hose) in a way that prevents the male fitting from making contact with anything else.

(4) Separate the dust cap and dust plug. **DO NOT PLACE THEM ON THE GROUND.**

(5) Holding the dust plug, place the dust cap on the male fitting of the cam-lock.

(6) Place the dust plug in the female fitting of the cam-lock.

(7) Close all four locking levers.

c. Turn off power to the heaters.

d. Turn off power to the hypochlorinator.

e. Turn off the pump and close the valves on the water tank(s).

f. Determine the topographical low point in the water distribution system. At this point, disconnect a hose section and permit the water in the hose to drain by gravity. If there is not one clear topographical low point; disconnect the hose at several points to encourage gravity draining.

g. While the hoses are draining, drain the remaining water from the storage tank(s). The location of the tank(s) may not be well suited for emptying their contents in place. You may wish to connect one or more lengths of discharge hose and drain the tanks away from the hospital. Use the pump to speed up the process. Set the pump up with suction hose, just as when laying the system out. Use as much hose as necessary to drain the tank(s) wherever you wish. **NOTE: Select a drainage location where the slope of the ground will not carry the water into the hospital area. NOTE: As the water storage tank empties, the water pump may become dry and subject to damage. Ensure that the water pump is in the water. Use caution to prevent the pump from running and burning up when the water level in the tank(s) falls below 6 inches.**

h. Once the tank(s) is empty, open the drain cock on the pump and let the pump body drain. Tip the pump up to remove any water

remaining in the bottom of the pump body. Leave the drain cock open to allow the pump body to air-dry.

i. While the system is draining, disassemble the hose, starting at the water tank(s).

(1) Remove the gate valves and tee fittings before rolling hoses for storage. Reattach the dust caps and dust plugs to the fittings as you disconnect them. Place the fittings in the Cage, Wire Folding

CAUTION
To prevent contaminants from entering the system, reattach dust caps and dust plugs to fittings and hoses before storage.

(2) When rolling hoses, leave the far end of the hose open to allow any remaining water to drain. If possible, keep that end off the ground. If this is not possible, rinse the end of the hose before attaching the dust cap or dust plug.

Figure 2-47
Suggested Method of Rolling 1½ inch Hose

(3) Several lengths of short hose can be rolled as one piece.

(4) 1 inch hose cannot be rolled in the same manner as 1½ inch hose. It must be fed into the cage and coiled in layers.

j. Remove the hoses from the inside of the Tempers. The instructions here presume that the hose in the TEMPER is part of a secondary loop.

(1) Close all gate valves. This includes the valves to feeder lines, field sinks, and the valves at the beginning and end of the loop.

(2) Disconnect all feeder lines and field sinks from the secondary loop. Leave gate valves attached to the secondary loop.

(3) Disconnect the cam-lock connections immediately outside each end of the TEMPER. Lift one end of the hose and walk it through

the TEMPER. Use caution as the fittings could rip the flooring.

CAUTION
Handle the hose inside the TEMPER with care. The fittings may damage the canvas or flooring.

k. Prior to storing the flowmeters and pressure gauges open the caps and plugs on each item and drain the water. Shake any additional water from each item before replacing the caps and plugs. Store them in the Case, Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

l. Advise users of the Hamilton sink to open the drain cock, pressure release valve, and heater drain valve. All of these components are inside the sink base and covered in more detail and discussed in the Hamilton sink operator's manual. These steps allow water to drain from the pump and the heater. This prevents the formation of rust and growth of bacteria.

2-7. Preventive Maintenance.

The following preventative checks and services should be done periodically during operation. They should also be done prior to storing the equipment following completion of a mission or field training exercise.

a. *Water Storage Tanks.* Operator, Maintenance, and PMCS are addressed in the applicable Technical Manuals

b. *Pump.* Operator, Maintenance and PMCS are addressed in TM 5-4320-274-14&P and Chapter 5 of this manual.

c. *Discharge Hose.* Check hoses for abrasions, cuts, and gouges. Check for –

- Presence of bulges or seepage during operations.
- Presence and condition of locking levers.
- Presence and condition of hose clamps.
- Presence of cap and plug attached by chain and key rings.
- Abrasions on cam-lock fittings.
- Presence and condition of gaskets inside the female fittings and caps.

d. *Suction Hose.* Perform the same checks for the discharge hose. The shape of the hose is maintained by steel coils and should be generally round. If the hose is deformed (normally caused by vehicle traffic), use a rubber or lead hammer to restore the cylinder shape of the hose.

e. *Fittings and Valves.* Check

- For cracks in the body of the fitting or valve.
- For leakage at the threads
- For broken or bent handles on gate valves.

- To ensure that the nut at the top of the rising stem gate valve is secure.

f. *Gauges and Flowmeters.* In addition to functional checks during normal operations, check for

- Cracked or broken glass.
- The presence of caps and plugs attached by chain and key rings.
- Presence and condition of gaskets inside the female fittings and caps.

2-8. Repair Procedures.

Part of the Water Distribution and Wastewater Management System (WDWWMS) is the WDWWMS Maintenance Set that includes an assortment of repair parts and critical tools to maintain the system. This set is fielded with the remainder of the system. It is the user's responsibility to replenish the components as needed.

a. *Hose.* The repair procedures discussed here applies to both suction and discharge hoses.

(1) *Broken, torn, or punctured hose.* The principal behind repair services for a damaged hose is to make two good hose sections from one damaged one. Dispose of pieces of hose shorter than 2 feet.

(a) Use a hacksaw to cut the hose and remove the damaged portion.

(b) Place two hose clamps (from the maintenance set) over the newly cut end.

(c) Insert a hose coupling in the newly cut end, as far as it will go. The coupling must be the opposite gender of the cam-lock fitting on the other end of the hose.

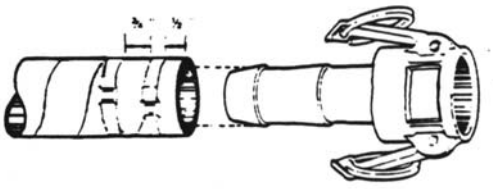


Figure 2-48
Hose Repair

(d) Position the hose clamps near the end of the fitting.

(e) Tighten the hose clamps and trim off the excess.

(f) Attach key rings, chain, and caps (or plugs).

(g) Repeat steps (b) through (f) for the other piece of hose.

b. *Fittings and Valves.* Replace missing or damaged caps, plugs, chains, and rings as needed. The complete fittings and valve assemblies are made up of individual parts that may be requisitioned separately. Should a fitting or valve become unserviceable, retain the serviceable parts for use in reassembling the fitting or valve. This can also be applied to the nozzle, flowmeters and pressure gauge.

CHAPTER 3

WATER DISTRIBUTION SET (WDS)
Medical Re-Engineering Initiative (MRI) 84 Bed Configuration

OPERATOR'S, PMCS, AND REPAIR INSTRUCTIONS

3-1. Introduction

a. This chapter describes the assembly, operation, and disassembly of the Water Distribution Set (WDS) (MRI 84-Bed Configuration).

b. The main reason for having a pressurized water distribution system is to control infection and communicable diseases in the hospital. The WDS accomplishes this by starting with covered water storage tanks, pressurizes the water with electric pumps, adds chlorine as necessary, and routes the potable water through a distribution system to designated areas of the hospital.

c. It is necessary that you coordinate early with Preventive Medicine personnel to inspect, take samples from, and analyze the water distribution system. Advise hospital personnel that the water from the system cannot be considered potable until certified by Preventive Medicine personnel.

3-2. Components.

a. *Cam-Lock Connections.* With two exceptions every connection in the water distribution system is connected to similar hoses by use of cam-lock fittings. The exception connects are the field sink adapter and the ISO adapter. Both connections are discussed later in this chapter. Cam-lock is a quick disconnection system that requires no special training or tools. There are no threads on the parts or hoses to be connected. To use cam-lock fittings, the dust cap or plug is removed from each hose end, then insert the male end fitting into the female end of the other fitting. Pull the levers back towards the hose to cam-lock the two parts together. There are some steps to be followed in making and breaking a hose connection. These steps are discussed later in this manual.

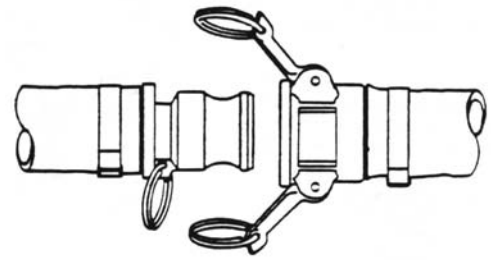


Figure 3-1
Cam-Lock Connection

- *b. Water Storage Tanks.* Units are authorized the following type of water storage tanks. Tank, Fabric, Collapsible, 5,000 Gallon Capacity – 1 each

PICTURE TO BE PUBLISHED

Figure 3-2
Tank Fabric, 5,000 Gallon , Collapsible

c. *Water Pump.* The water pump used in this WDS is Pump Unit, Centrifugal, 65 GPM (NSN 4320-01-506-4459) has a 220 volt, 3-phase, totally enclosed, fan-cooled, electric motor. Each water pump is supplied with an integral power cord (40') that terminates in a male Class "L" power connector. The plug interfaces directly with the DEPMEDS electrical distribution system. Each pump is outfitted with a male and female, 1 1/2-inch cam-lock connection. There are two pumps in the WDS. One pump will serve the primary water distribution loop of the hospital, and the other is used to augment or maintain pressure through the secondary loops.

CAUTION
Two persons are required to lift or carry a water pump.

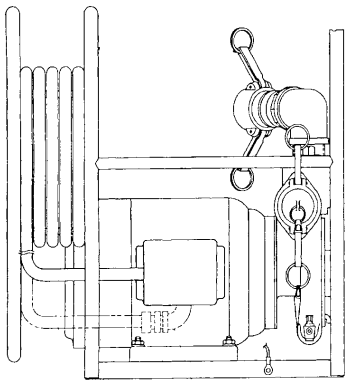


Figure 3-3
Pump Unit, Centrifugal, 65 GPM

d. *Hoses*. The hoses that are contained within the WDS are:

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8338)
PN: 13225E9136-14
5 feet in length, 1 inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-175-5958)
PN: 13225E9136-12
10 feet in length, 1 inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-177-3714)
PN: 13225E9136-13
20 feet in length, 1 inch diameter
Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8337)
PN: 13225E9136-15
50 feet in length, 1 inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-7779)
PN: 13225E9135-9
10 feet in length, 1½ inch diameter

Hose Assembly, Nonmetallic
(Discharge)
(NSN: 4720-01-438-8343)
PN: 13225E9136-9
10 feet in length, 1½ inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8341)
PN: 13225E9136-10
20 feet in length, 1½ inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8335)
PN: 13225E9136-18
50 feet in length, 1½ inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-140-6288)
PN: 13225E9136-4

20 feet in length, 4-inch diameter

e. *Fittings and Valves.* There are numerous fittings and valves within the WDS. With two exceptions every fitting in the set has cam-lock connections.

(1) Reducer, Quick Disconnect, 4-inch female, 2-inch male (NSN: 4730-01-064-0560) (PN: AA59326XI-1-9). This reducer is used on the supply side of the Tank, Fabric, Collapsible 5,000-gallon.

NOTE: Some valves and fitting descriptions are identified with the letter F for female and M for male connections.

(2) Reducer, Quick Disconnect, 4-inch male, 2-inch female (NSN: 4730-01-064-0821) (PN: AA59326XI-1-10). This reducer is used on the supply side of the Tank, Fabric, Collapsible 5,000-gallon.

(3) Valve, Gate, 2 inch female, 1 ½ inch male (NSN 4820-01-440-8306) (PN 13229E7178). This valve is used on the output of Tank Assembly, Fabric Collapsible (3,000 gallon) (LIN: TT19033, NSN: 5430-01-170-6983) or Tank Assembly, Fabric Collapsible (5,000 gallon).

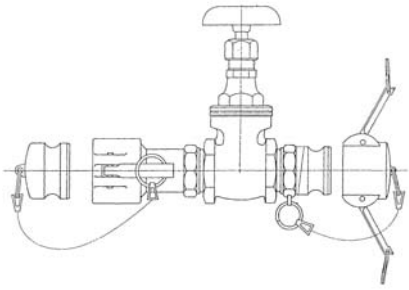


Figure 3-4
Valve, Gate, 1½-inch female, 2-inch male

(4) Valve, Gate,1 ½ inch female, 2 inch male (NSN: 4820-01-440-8302, PN 13229E7177). This valve is used on the return of Tank Assembly, Fabric Collapsible (3,000 gallon) (LIN: TT19033, NSN: 5430-01-170-6983) or Tank Assembly, Fabric Collapsible (5,000 gallon).

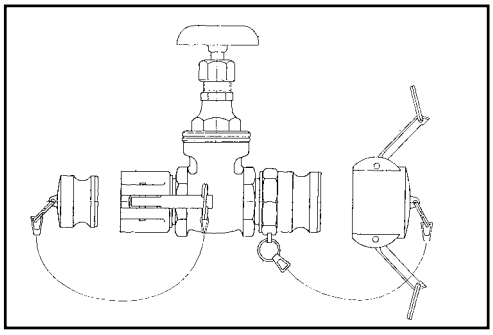


Figure 3-5
Valve, Gate, 1½- inch male, 2-inch female

(5) Valve, Globe, 1½ inch female, 1½ inch male (NSN: 4820-01-440-8765, PN: 13229E7169). This valve is attached to the 1½ inch loop, immediately after the beginning of a 1-inch loop. The valve is manually adjusted to control the rate of flow in the system.

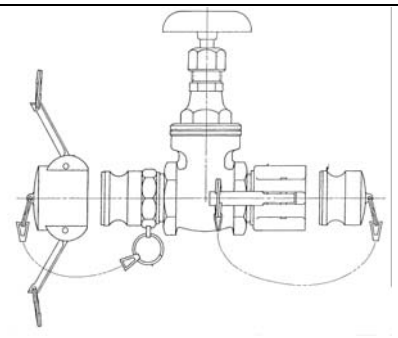


Figure 3-6
Valve, Globe, 1½-inch female, 1½-inch male

(6) Valve, Gate, 1-inch female, 1-inch male (NSN: 4820-01-440-7798, PN: 13229E7167). When used with individual water users, such as field sinks and nozzles, this valve controls the rate of flow. It is also used at the beginning of secondary loops and long one-way water lines. Used this way, repairs or changes in the secondary loops can be made without interrupting water supply to the rest of the hospital.

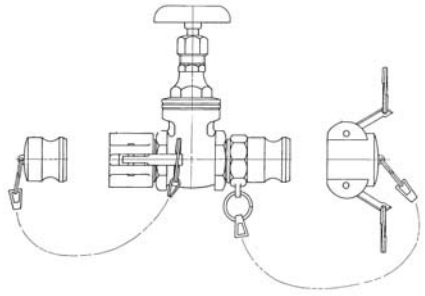


Figure 3-7
Valve, Gate, 1-inch female, 1-inch male

(7) Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch male x 1-inch male (NSN: 4730-01-440-4609, PN: 13229E7172). This fitting is used at each place where the one-way feeder lines branch off to the individual users, such as CMS, pharmacy, X-Ray, laboratory, etc. It is also used at the beginning and end of the secondary loop.

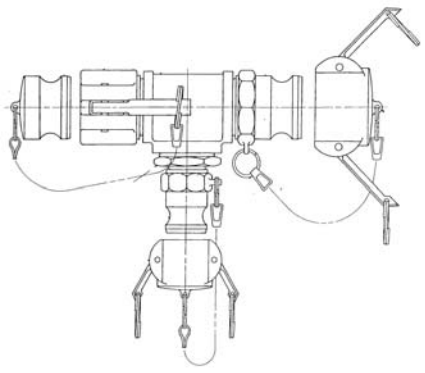


Figure 3-8
Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch male x 1-inch male

(8) Tee Assembly, Quick Disconnect, 1-inch female, 1-inch male, 1-inch male (NSN: 4730-01-440-4091, PN: 13229E0361). This fitting allows connection of the individual users along secondary loops or long one-way lines.

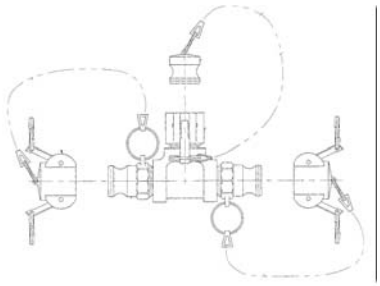


Figure 3-9
Tee Assembly, Quick Disconnect, 1-inch female x 1-inch male x 1-inch male

(9) Tee Assembly, Quick Disconnect, 1½-inch female, 1½-inch female, 1½-inch male (NSN: 4730-01-440-4615, PN: 13229E7181). This fitting is located between the Tank Assembly, Fabric Collapsible (3,000 Gallon) (LIN: T19033, NSN: 5430-01-170-6984) or Tank Assembly, Fabric Collapsible (5,000 gallon) and the Pump 65 GPM [NSN

4320-01-440-4421] when two or more Tank Assemblies employed in parallel.

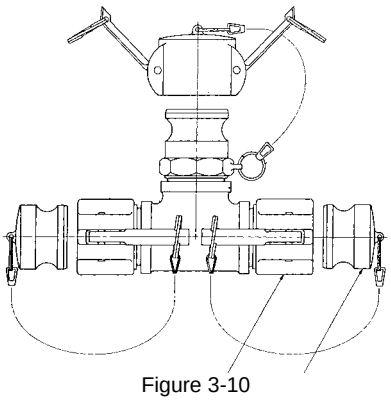


Figure 3-10
Tee Assembly, Quick Disconnect, 1½ inch female x 1½ inch female x 1½ inch male

(10) Tee Assembly, Quick Disconnect, 1½-inch female, 1½-inch male x ¼-inch male (NSN: 4730-01-487-3575) is used to connect the Hypochlorination Unit (NSN: 4610-01-435-4884) (PN: WAL-1031-96) to the primary loop.

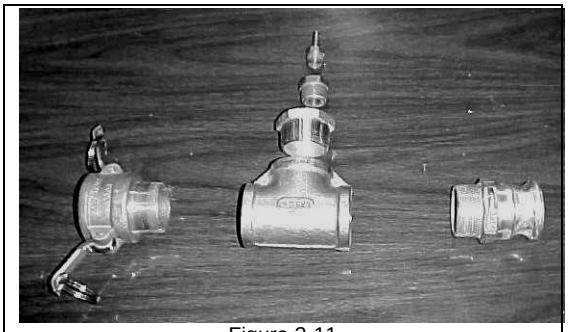


Figure 3-11
Tee Assembly, Quick Disconnect, 1½ inch female, 1½ inch male x ¼ inch male

(11) Coupling Assembly, Quick Disconnect, 1-inch female x 1-inch female (NSN: 4730-01-440-8569, PN: 13229E7173). This coupler is commonly referred to as a "Gender Changer". It is used when a male outlet is connected to a second male connection and as a connection on the Hamilton Sink connections for the ISO containers.

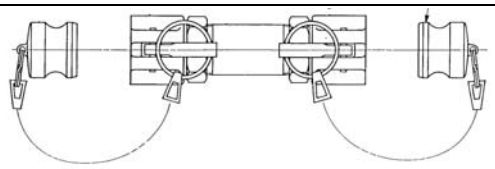


Figure 3-12
Coupling Assembly, Quick Disconnect, 1-inch female x 1-inch female

(12) Plug, Quick Disconnect (NSN: 4730-01-415-6403, PN: 13229E7170). This fitting is used in conjunction with Adapter, Straight Hose to Boss (NSN: 4730-01-415-6420, PN: 13229E7195) to connect field sinks to the water loop.

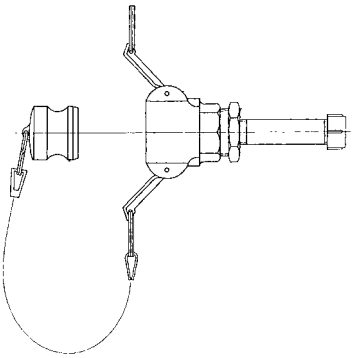


Figure 3-13
Plug, Quick Disconnect

(13) Adapter, Straight Hose to Boss (NSN: 4730-01-415-6420, PN: 13229E7195). This fitting is used in conjunction with Plug, Quick Disconnect (NSN: 4730-01-415-6403, PN: 13229E7170) to connect field sinks to the water loop. This is the first example where both connections are not cam-lock.

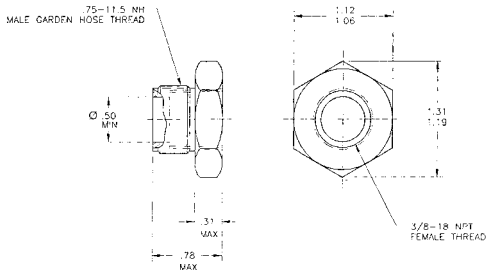


Figure 3-14
Adapter, Straight Hose to Boss

(14) Valve, Check (NSN 4820-01-440-5919, PN: 13229E7197). This valve is used to keep water in the potable hose line from reversing flow.

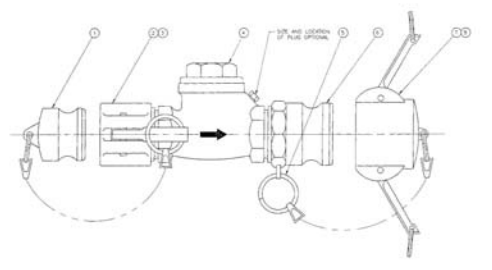


Figure 3-15
Valve, Check

(15) Adapter Assembly, Quick Disconnect, 4-inch female to 1½-inch male (NSN: 4730-01-445-5188) (PN: 13229E7190).

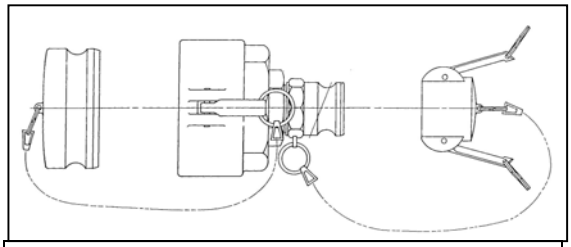


Figure 3-16
Adapter Assembly, Quick Disconnect

(16) Reducer Quick Disconnect, 1-inch female to 1½-inch male (NSN: 4730-01-499-8752) (PN: 3629). This fitting is used to connect the Heater, Water, 9,000 Watts (NSN: 4520-01-493-7423) (PN: 111739) to the secondary potable water distribution lines.

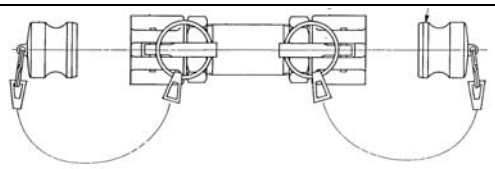


Figure 3-17
Reducer, Quick Disconnect
1-inch Female to 1½ inch Male

(17) Reducer Quick Disconnect, 1½-inch female to 1-inch male (NSN: 4730-01-499-8787) (PN: 3630). This fitting is used to connect the Heater, Water, 9,000 Watts (NSN: 4520-01-493-7423) (PN: 111739) to the secondary potable water distribution lines.

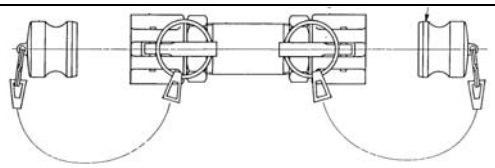


Figure 3-18
Reducer, Quick Disconnect
1½ inch Female, 1-inch Male

f. Other Components

(1) Pipe Assembly, Potable Water (NSN: 4610-01-440-4086, PN: 13229E7162). This component measures the water pressure in the distribution system. This gauge is generally placed at the return end of the main loop. Its precise location depends on how the tanks are employed. **THE PRESSURE GAUGE IS FRAGILE.** When not in use, store it in the Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

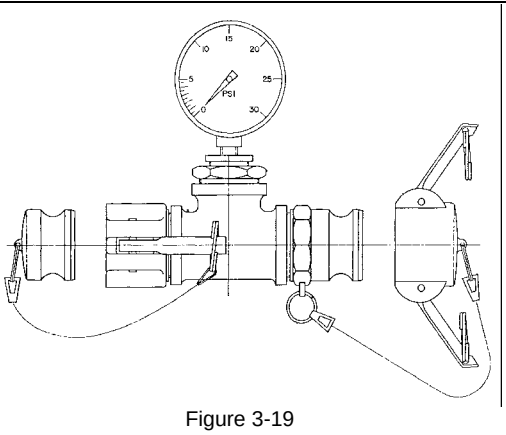


Figure 3-19
Pipe Assembly, Potable Water
(Pressure Gauge)

(2) Pipe Assembly, Potable Water (NSN: 4610-01-440-4088, PN: 13229E7165). The water distribution system uses a flow meter that measures flow rates up to 100 GPM. It is placed at the end of the primary loop, immediately before the pressure gauge. **FLOW METERS ARE FRAGILE.** When not in use, store them in the Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

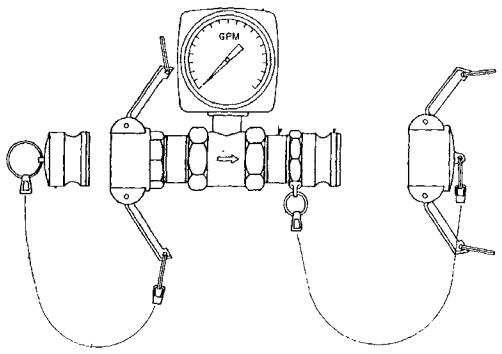


Figure 3-20
Pipe Assembly, Potable Water
(Flowmeter)

(3) Indicator Assembly (NSN: 4610-01-440-4090, PN: 13229E7163). This assembly is used to monitor water flow through the distribution system. **THIS ASSEMBLY IS FRAGILE.** When not in use, store it in the Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

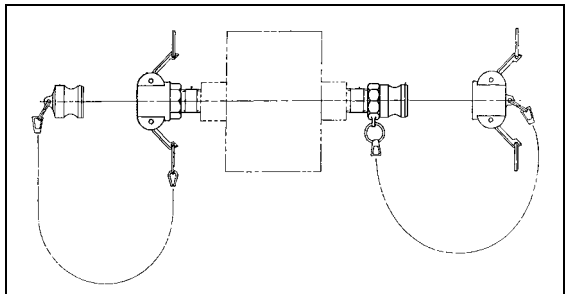


Figure 3-21
Indicator Assembly

(4) Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189). This case is used to store the pressure gauges, flow meters, indicator assembly and color comparator.

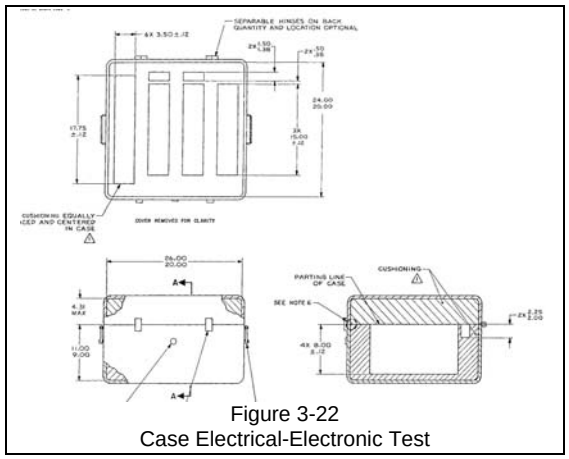


Figure 3-22
Case Electrical-Electronic Test

(5) Comparator, Color (NSN: 6630-01-044-0334, PN: U25377). The equipment operator to visually determine the turbidity of the supplied water uses the comparator.

(6) Stand Assembly, Distribution Nozzle (NSN: 4930-01-120-7426, PN: 13225E9140). This assembly is used to suspend the Nozzle Assembly, Water (NSN:

4610-01-440-8834, PN: 13229E7168).

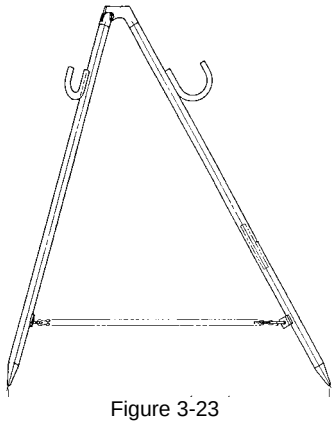


Figure 3-23
Stand Assembly, Distribution Nozzle

(7) Nozzle Assembly, Water (NSN: 4610-01-440-6834, PN: 13229E7168). The nozzle is provided to supply water to those parts of the hospital that are not connected to the water distribution system. Other uses for this nozzle are outlined in the principles of installation section of this chapter.

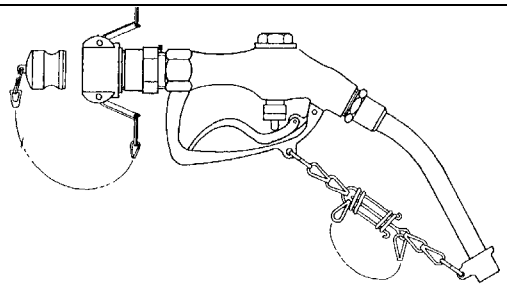


Figure 3-24
Nozzle Assembly, Water

(8) Strainer, Sediment (NSN: 4730-01-440-7662, PN: 13229E7179). This fitting is used to strain or remove large particles that could damage the water pumps in the water distribution system.

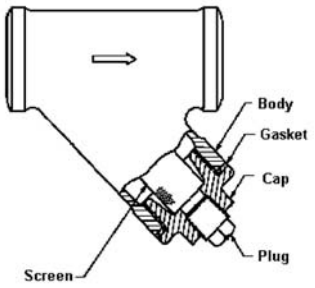


Figure 3-25
Strainer, Sediment

(9) Cage, Wire Folding. This cage is used to store hoses and fittings of the water set.

Figure 3-26
Cage, Wire Folding

(10) Pump Unit, Centrifugal (NSN: 4320-01-440-4421, PN: 13229E7159). The water pumps are supplied with the water distribution set. The water pumps are outfitted with quick-disconnect (cam-lock) fittings, and are rated at producing a 65 GPM water flow.

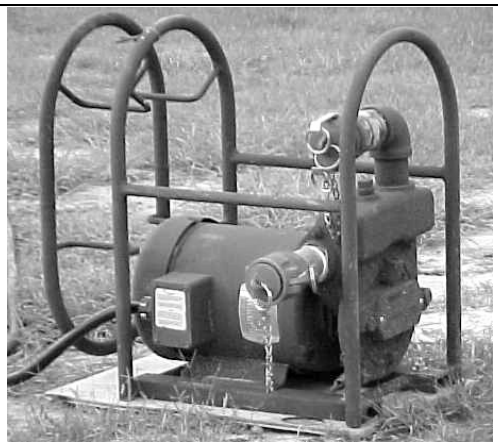


Figure 3-27
Pump Unit, Centrifugal

(11) Hypochlorination Unit (NSN: 4610-01-435-4884, PN: WAL 1031-96). This item is designed to treat and chlorinate the water within the water distribution system. The addition of chlorine based material to the water supply helps retard bacterial and fungal growth within the hoses. It is also designed to provide the capability to flush (hyper-chlorinate) the water lines.

Figure 3-28
Hypochlorination Unit

(12) Can, Water, Military (NSN: 7240-00-089-3827, PN: MIL-C-43613). This water can is provided for mixing the Sodium Hypochlorite (NaOcl) for the Hypochlorination Unit.

(13) Heater, Water, 9,000 Watts (PN: PWH). The, in-line water heater is provided for use of the system during cold weather operations. The heater is not intended to provide “hot” water, but raises the ambient temperature of the water in the hose lines by a few degrees to prevent freezing.

Figure 3-29
Heater, Water, 9,000 Watts

3-3. Principles of Installation

The water distribution set is intended to be as flexible in its layout as the DEPMEDS Combat Support Hospital itself. **THERE IS NO ONE “CORRECT WAY” TO SET UP THE WATER DISTRIBUTION SET.** The number of possible working configurations is almost unlimited. The information within this section provides the basic guidelines necessary for planning the layout for your hospital. Like other large footprint systems, the layout of the WDS must be planned in advance.

Obtain a copy of the hospital layout as soon as possible, to determine the best locations (to ensure access to refill the tank(s)) for the major component, the water storage tank(s).

a. Location of Tank(s), Fabric Collapsible. Placing the tank(s) fabric, collapsible is the most important decision in setting up the water distribution set. There are a number of factors to consider.

(1) *Traffic Flow.* Trucks delivering water need access to the tank(s).

(2) *Electric Power.* The Pump Assembly, Centrifugal (NSN 4320-01-440-4421), the heater (NSN 4520-01-492-7423), and the Hypochlorination Unit (NSN: 4610-01-435-4884) are placed next to the tank(s) and they need electric power. The electric cables for pump assembly is 40 feet long, and the cable for the Hypochlorination unit is 80 feet long.

(3) *Proximity of the Primary Loop.* The water distribution set is designed for the primary loop to be near the highest concentration of ISOs.

(4) *Sufficient Area.* The water distribution set comes with either one Tank, Fabric Collapsible, 3,000 gallon (which is 13.8 feet long by 13.8 feet wide) or one Tank, Fabric Collapsible, 5,000 gallon (which is 16.3 feet long by 16.3 feet wide).

g. Location of the Primary Loop. The ISOs make up the largest number of water users in the hospital. As such, they use a large amount of water. Fore this reason, the primary loop should make its circuit around the highest concentration of ISOs. This approach also has the advantage of reducing the length of the primary loop, as well as reducing the amount of hose needed to connect the ISOs. The number of hospital components being used, and their configuration dictates the length of the primary loop.

h. Secondary Loop(s) Secondary loops are normally installed instead of long one-way water lines. Water constantly moves in the secondary loops. This greatly reduces the amount of stagnant water, and the potential of bacterial and fungal growth. Flowing water stays cooler longer in summer, and resists freezing in winter.

i. Water Distribution Nozzles. The Nozzle Assemblies, Water, (NSN: 4610-01-440-6834) have several applications in the DEPMEDS, Combat Support Hospital.

(1) An important application of the nozzle assembly is to supply water to those areas of the hospital that are not connected to the water distribution set.

(2) The nozzle assembly is an efficient way of filling the autoclaves. Locate a nozzle, with Stand Assembly, Distribution Nozzle (NSN: 4930-01-120-7426) in the vicinity of

the Central Materiel Supply (CMS) TEMPER. The hand valve of the nozzle is not very sensitive to small adjustments and tends to give large quantities of water. For this reason you should install a 1 inch female-male Valve, Gate (NSN: 4820-01-440-7798, PN: 13229E7167) in the line leading to the nozzle assembly. Set the gate valve volume to reduce or adjust the flow of the water at the nozzle assembly. Adding this control feature should be at any location where excessive water is a potential problem. Locate the valve 20 feet or so away from the nozzle assembly to enable you to adjust overall flow without moving the valve.

j. Pedestrian and Vehicle Routes.

Hoses should not cross vehicle routes. Hoses in pedestrian paths should be kept to a minimum. If a hose must cross a TEMPER, do so in a corridor, and use a Channel, Hose Protector (NSN: 4720-01-440-4925 PN: 13229E7176 or NSN: 4720-01-440-4928 PN: 13229E7175) (Both of these types of channel protectors are contained in the Waste-Water Augmentation Set, Hospital, MF2K.

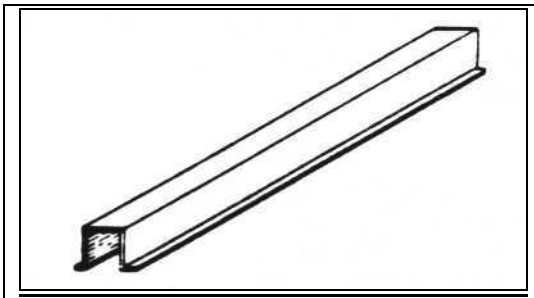


Figure 3-30
Channel, Hose Protector
(Subsurface)
NSN: 4720-01-440-4925

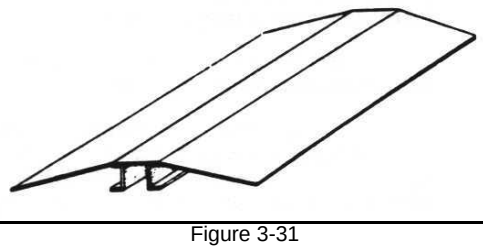


Figure 3-31
Channel, Hose Protector
(Surface)
NSN: 4720-01-440-4928

k. Location of In-Line Water Heaters. The in-line water heaters, supplied with this set are designed to keep the ambient temperature of the water within the hoses and bladders above freezing. The system is designed to have 4 heaters per primary loop, and 4 heaters per secondary loop. They come with cam-lock, quick disconnect fittings, and can be placed a various locations along the loop run. When planning on your setup, remember that these heaters require 208 Volts, AC electrical power and consequently must be located within 40 feet of a power distribution center (PDC). Also, the heaters should be placed as equally as possible along each loop.

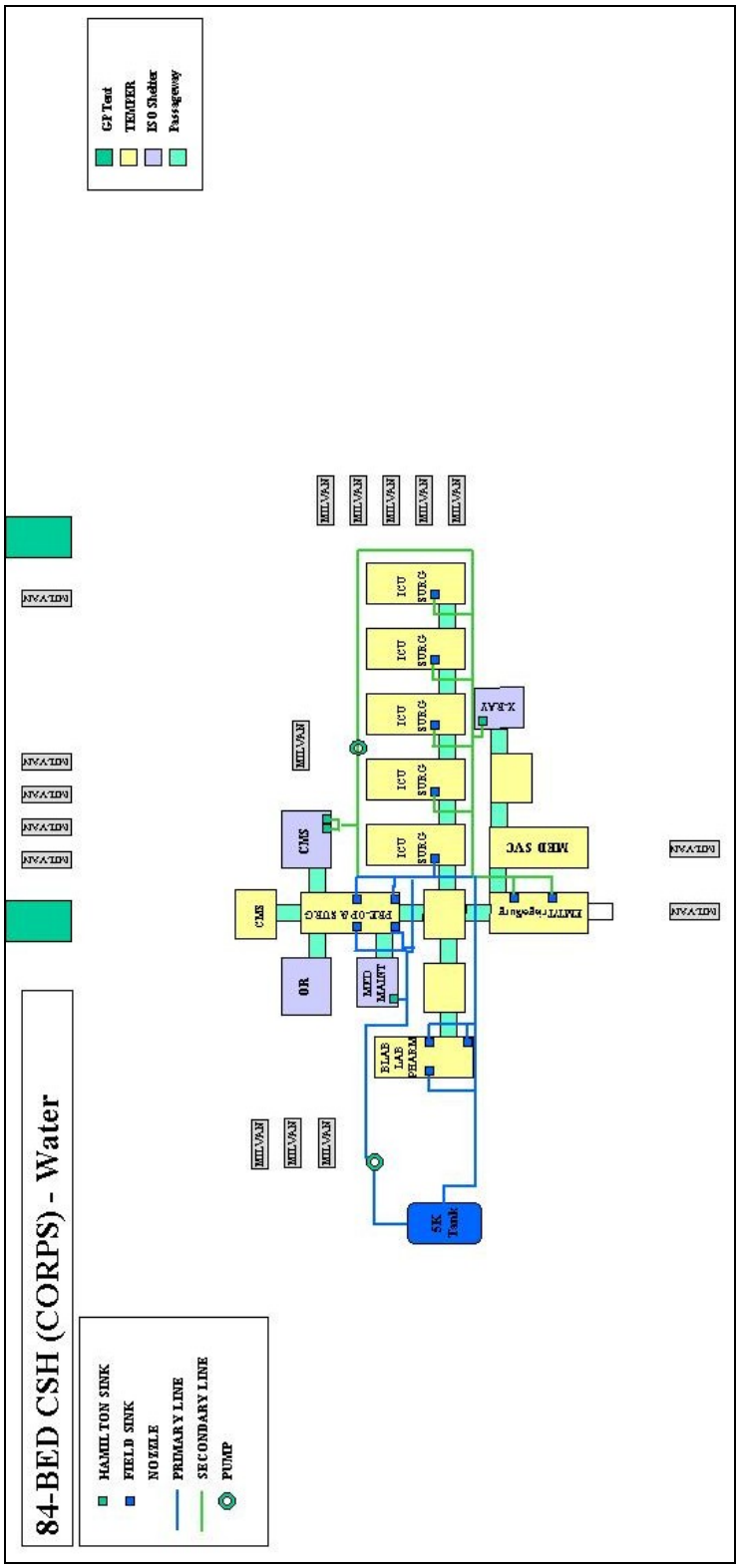


Figure 3-32
Recommended Water Distribution Layout for the MRI 84-Bed CSH

3-4. Assembly. This section provides general guidance and some hard rules on how to assembly the water distribution set. Prior to assembly of the WDS, you should determine the layout of the water distribution set based on the information of previous paragraphs, and the Commander's desired hospital layout. It is helpful to sketch the layout of the water distribution set over the layout diagram of the hospital.

a. Assemble the tank(s) fabric, collapsible, 3,000 Gallon or tank(s) fabric, collapsible, 5,000 Gallon. Locate them using the information in paragraph 3-3a.

(1) Attach the Valve, Gate [2-inch female x 1½-inch male] (NSN: 4820-01-440-8306) to the tank, fabric collapsible on the outlet port of the tank. **(MAKE SURE THE VALVE IS TURNED OFF.)**

(2) Attach the Valve, Gate [1½-inch female x 2-inch male] (NSN: 4820-01-440-8302) to the tank, fabric, collapsible on the inlet port of the tank. **(MAKE SURE THE VALVE IS TURNED OFF.)**

b. Attach the strainer, Sediment (NSN 4730-01-440-7662). The location of the strainer depends on the configuration of the tanks. But, it should be located between the outlet port of the tank and the Pump Assembly, Centrifugal.

c. Connect the suction hose (1½-inch x 10-feet) between the pump and the assembly for the outlet port of the tank and the pump.

d. Select open 40-60 Ampere female connections on the power distribution panel (PDC). **MAKE SURE THE CIRCUIT BREAKER ON THE PDC IS OFF**. Connect the water pump's and heater electrical plug to the selected receptacle on the PDC.

NOTE
Do not power any pump until the water system is connected.

NOTE
Do not power any heater until the water system is connected and pumping water.

e. Lay the primary loop following the guidance in paragraph 3-3c. **DO NOT CONNECT ANY HOSES AT THIS TIME. DO NOT REMOVE THE CAPS OR PLUGS.** Be aware of the requirement of fittings near the ISO Container walls that have water receptacles. Connections between hoses in the primary loop should occur near these points. Also be aware of other requirements for breaks in the loop, such as secondary loops, feeder lines to individual users, nozzles to CMS, and inclusion of the Heater, Water, 9,000 Watts at various points in the primary and secondary loop(s).

f. Lay the 1-inch hose for the feeder lines between the main loop and the ISOs. This process more clearly defines the needs for breaks in the primary loop and for fittings. The CMS ISO has two water receptacles. All other ISOs have one water receptacle (except for OR, which has none) Place a 1-inch gate valve (NSN: 4820-01-440-7798) next to the tee assembly (NSN: 4730-01-440-4609). Placing the valve here enables you to disconnect an individual ISO without disrupting water supply to the rest of the hospital.

g. Lay the fittings and hose for the secondary loop(s). The beginning of each secondary loop of each secondary loop is configured

h. The return side of each secondary loop is configured like that shown in the figure below.

i. Lay the necessary fittings and hose to connect the field sinks.

j. Lay hose lines to the nozzle locations. Place one nozzle next to each CMS tent. These hose lines need enough slack so that the nozzle can reach each autoclave. Place the 1-inch gate valve far enough away from the nozzle so that when the nozzle and hose are moved, the gate valve is not dragged.

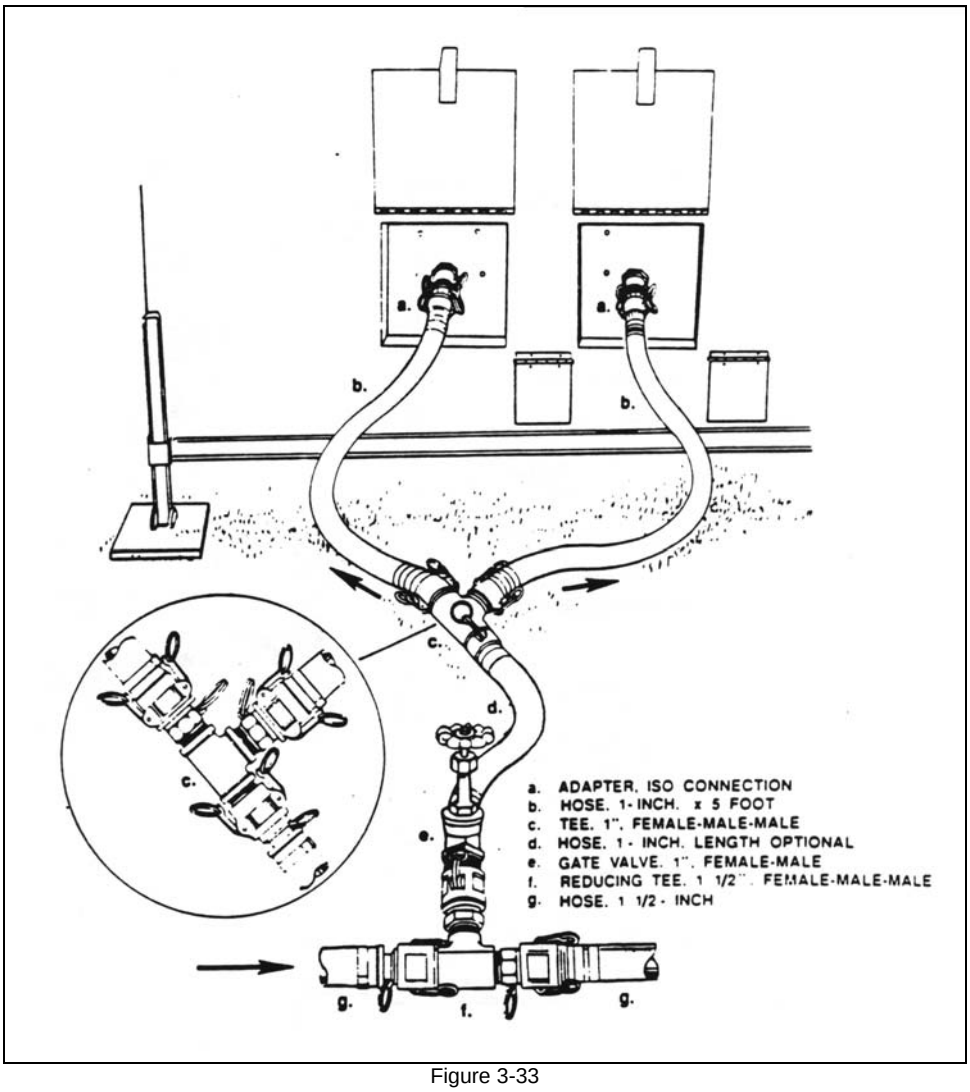

a. ADAPTER, ISO CONNECTION
b. HOSE, 1-INCH, x 5 FOOT
c. TEE, 1", FEMALE-MALE-MALE
d. HOSE, 1-INCH, LENGTH OPTIONAL
e. GATE VALVE, 1", FEMALE-MALE
f. REDUCING TEE, 1 1/2", FEMALE-MALE-MALE
g. HOSE, 1 1/2-INCH

Figure 3-33
Water Hose Connection to the CMS ISO

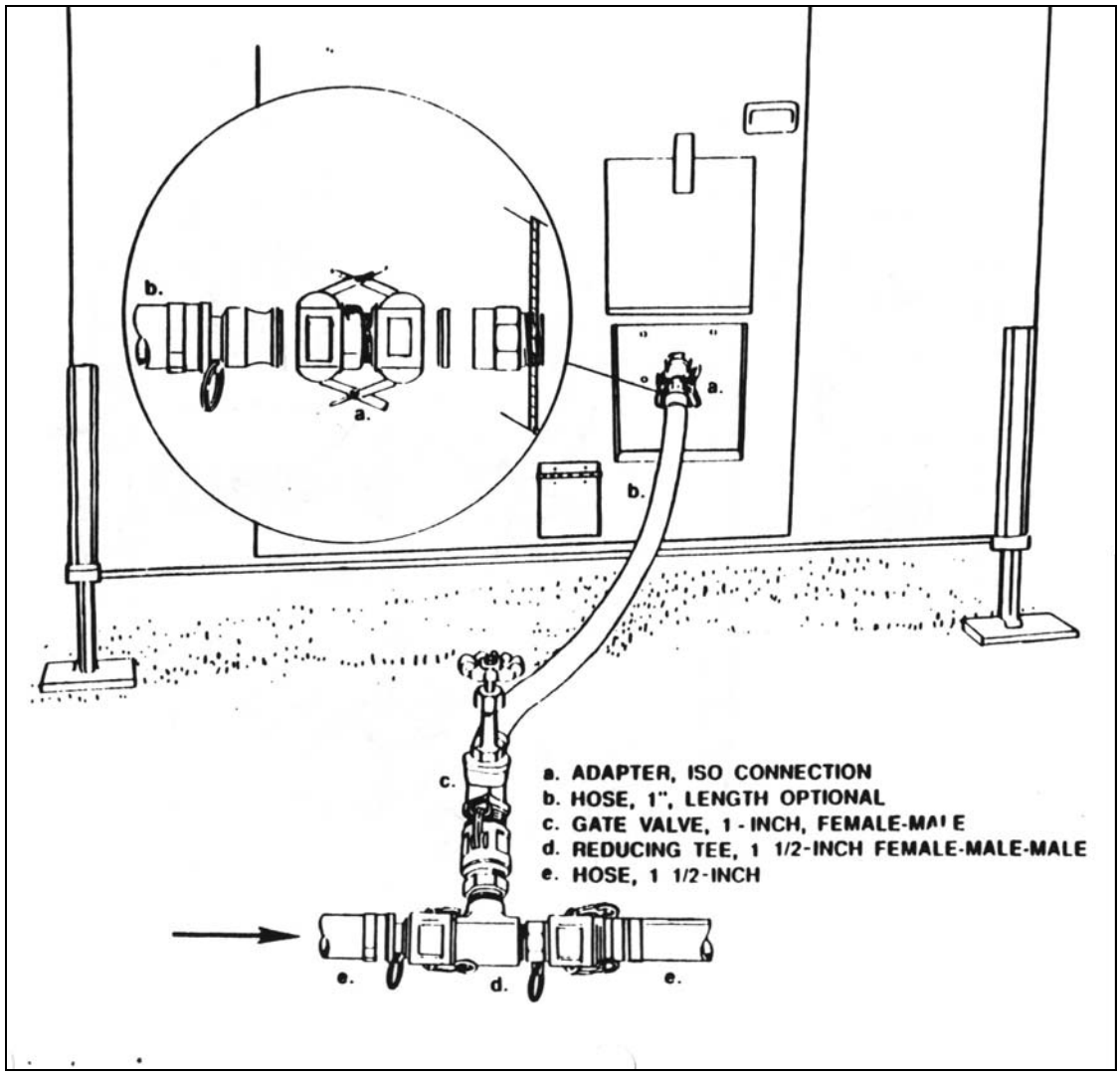


Figure 3-34
Connection to a Single Receptacle ISO (with hose)

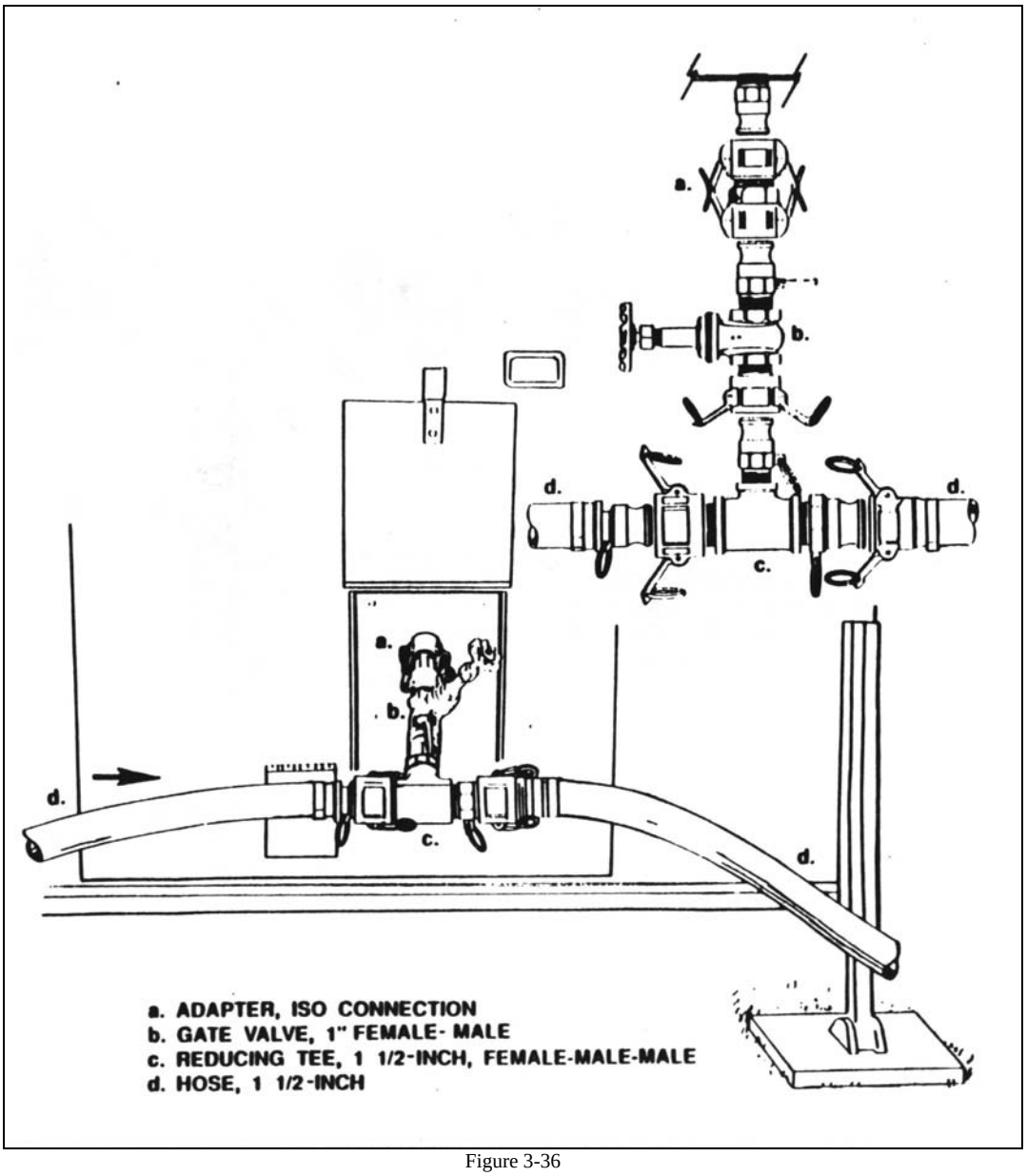


Figure 3-36
Connection to a Single Receptacle ISO (without hose)

k. Use the hose protection channels for hose that will cross TEMPER corridors. If conditions and time permit you may bury the hose and the channel protector, but it is not necessary. Run the hose under the edge of the tent flap and both layers of the floor. You may need to untie the floor tie-downs. Place the protective channel over a hose connection.

l. With the system laid out prepare for the assembly. Correct assembly of the hoses and cam-lock fittings is easier if the fittings are clean. Dirty or mud-encrusted connections must be cleaned off prior to assembly. It is absolutely essential to avoid contaminating the inside of the hoses and fittings. Follow the procedure below as closely as possible.

CAUTION
Correct assembly of connections is essential to avoid contaminating the system.

(1) Open the locking levers for both cam-lock connectors. **DO NOT REMOVE THE FEMALE DUST CAP OR MALE DUST PLUG.**

(2) Place the female connector on an elevated surface (such as the toe of your boot), that allows the opening of the fitting to be face up, or off the ground. This procedure, which applies to all connections, reduces the chance of contaminants entering the fitting.

(3) Lay the male fitting across the female fitting.

(4) Remove the dust plug from the female fitting.

(5) Holding the dust plug in your hand; remove the dust cap from the male fitting.

(6) Connect the dust plug and dust cap to each other. Close the locking levers and lay them on the ground.

(7) Connect the male and female hose connectors or valve fittings without allowing the fittings to touch the ground. Close the locking levers.

(8) If you find dirty connections during the assembly process, ensure that they are cleaned prior to assembly.

(9) Use this procedure to make all the connections in the system. One exception is the connection at the ISO. The male fitting on the ISO does not have a dust cap. Because of this, the dust plug from the female-female adapter will not have a matching connection.

Final checks to be done **BEFORE TURNING ON THE WATER.**

(1) Open all gate valves in the primary and secondary loop(s), and to the nozzles and ISOs.

(2) Close all valves to the field sinks.

(3) Close the globe valves on the Interior wall panel of the ISO. Ensure the Hamilton sinks are ready by closing the:

(a) Drain cock on the pump.

(b) Valve at the top of the pump body.

(c) Heater drain valve.

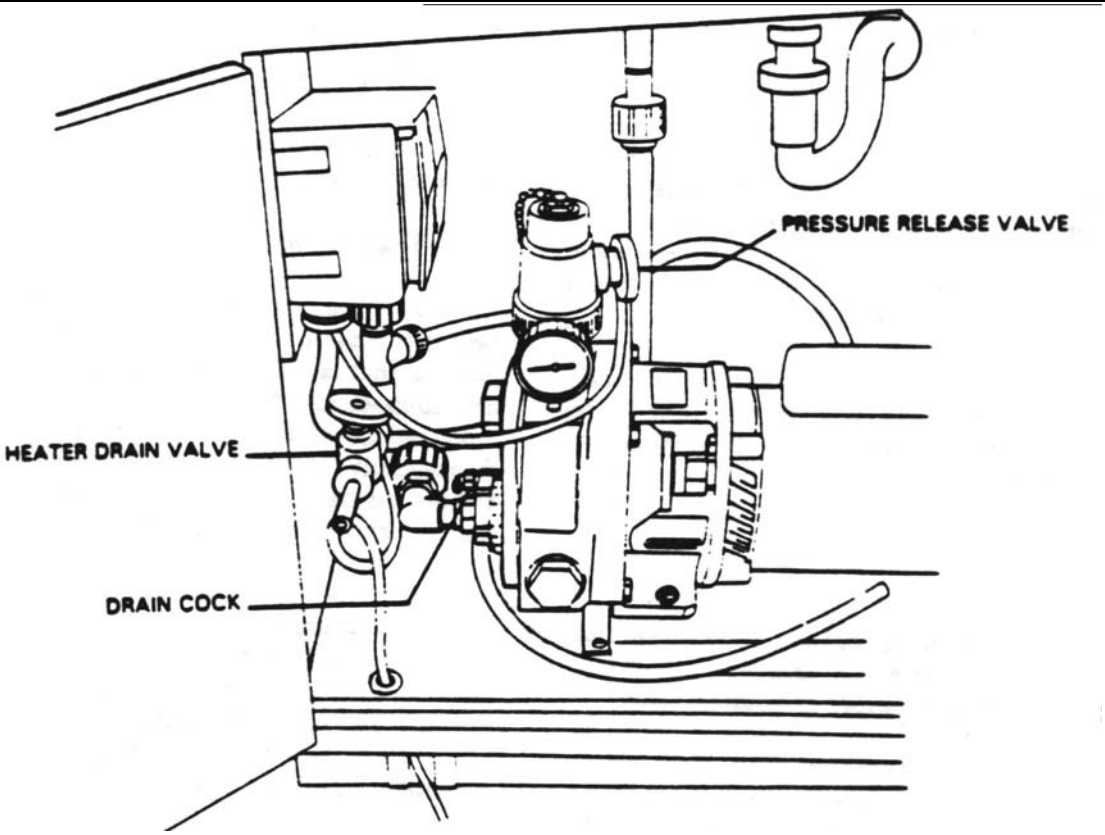


Figure 3-37
Hamilton Sink Connection

(4) Make sure that the field sinks are ready. Instruct users of the field sinks connected to the system to set them up for gravity operation in accordance with the manufacturer's literature.

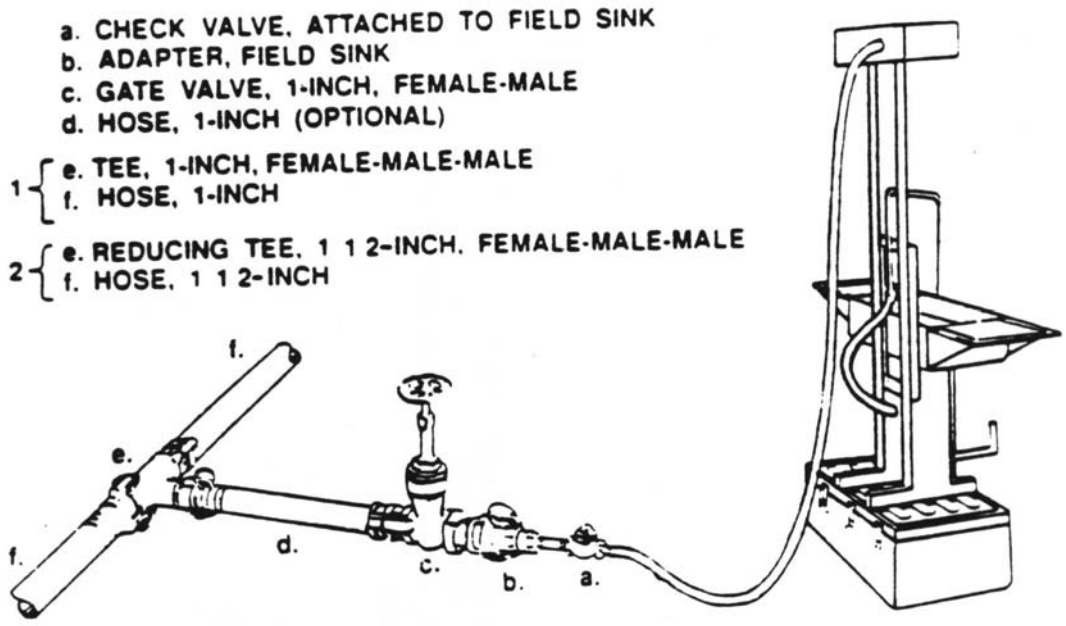


Figure 3-38
Field Sink Connection

(5) With water in the storage tank(s) and all of the connections made:

(a) Open the valve on the storage tank immediately before the pump.

(b) Remove the nut at the top of the pump assembly body. Refer to TM 5-4320-274-14&P. With a water tank full of water, the pump will prime itself. Removing the nut allows air to escape: water fills the pump body. Once water has reached the nut opening, replace the nut and tighten firmly.

(c) Open the gate valve at the return side of the water tank. If you are using more than one tank, open the valves between the tanks.

(d) Turn on the circuit for the pump.

(e) Turn on the circuit for the Hypochlorinator.

(f) Turn on the circuits for the in-line water heaters.

l. Adjust the rate of flow at the return side of the distribution system. Adjust the rate of flow with the gate valve so that the pressure gauge reads between 8 and 12 pounds per square inch (psi).

m. Adjust the flow at the secondary loop(s). The presence of water in the secondary loop(s) does not mean that water is flowing through the loop(s). To ensure water is flowing, gradually close the 1½ inch gate valve. Continue closing the valve until the flowmeter reads between 5 and 10 gallons per minute.

n. Return to the gate vale by the pressure gauge. After adjusting the flow for the secondary loop(s), the flow rate here may need to be adjusted. Use the gate valve to adjust the rate of flow until the pressure gauge reads between 8 and 12 psi.

o. Go to each Hamilton sink. Instruct the users to double-check that the sinks are ready. Have them open the globe valve on the ISO wall. Turn on the water. The initial water from the faucet may appear rusty. This is rust that was on the inside of the body of the pump in the Hamilton sink. Allow the water to run until the water clears.

p. Go to each field sink connected in the water distribution system. Instruct the users to open the gate valve, but not all the way. If there are any leaks anywhere but at the threaded fittings, defer the sink to maintenance. Users can correct leaks at the fittings by tightening them with a pair of pliers. It is up to the user to adjust the rate of flow to the sink with the gate valve.

q. Before the water is used, direct the field sanitation team to test the chlorine in the water storage tank(s). Then operate EVERY sink in the system for three to five minutes. Operate each nozzle for one minute. This flushes the system of potential contaminants that may have entered the hoses and fittings since last use.

r. Coordinate with preventive medicine personnel to inspect the system and take water samples. Coordinate also with regular preventive medicine for regular inspections and sampling.

3-5. Operation

The purpose of this paragraph is to ensure that the equipment is operated safely and that the system provides a continuous supply of potable water.

a. Monitor the water supply. Turn off the pump when the depth of water in the water tank is less than 8 inches. The bearings in the water pump will burn out if the pump impeller is not covered with water.

b. The field sanitation team should monitor the chlorine residual in the water supply. Measure chlorine residual at the water tank(s), and 20 percent of the sinks and nozzles in the distribution system daily. A chlorine residual is essential for preventing biological contamination. However, too high a chlorine residual will make the water taste bad.

c. Remove and clean the filter in the filter assembly daily. This requires shutting down the pump. In order to minimize downtime, have a clean filter ready for immediate installation. Follow the procedure below to change the filter.

(1) Turn off power to the heaters.

(2) Turn off power to the hypochlorinator.

(3) Turn off the power to the pumps.

(4) Close the gate valve by the filter assembly.

(5) Change filters in the filter assembly.

(6) Open the gate valve.

(7) Prime the pump.

(8) Turn on the power to the pump.

(9) Turn on power to the hypochlorinator.

(10) Turn on power to the heaters.

(11) Clean the old filter and place it in the storage container.

3-6. Disassembly.

a. The procedures discussed here will enable you to disassemble the system in a manner that is efficient and minimizes the chance of contamination. The procedure is intended to be independent of any other actions associated with the disassembly of the hospital. However, hose lines located inside a TEMPER must be removed before the tent can be disassembled.

b. Disconnecting the cam-lock fittings is **not** the first thing done in disassembly. However, it is the most frequent task and warrants being discussed first. This procedure is not the reverse of the assembly process previously discussed. The intent is the same though; disconnect with minimal risk of contaminating the system.

(1) Unlock all four locking levers.

(2) Separate the fittings. Rest the female fitting on a protective surface **(NOT ON THE GROUND)** with its opening up. The toe of your boot will work.

(3) Lay the male fitting on the female fitting (or hose) in a way that prevents the male fitting from making contact with anything else.

(4) Separate the dust cap and dust plug. **DO NOT PLACE THEM ON THE GROUND.**

(5) Holding the dust plug, place the dust cap on the male fitting of the cam-lock.

(6) Place the dust plug in the female fitting of the cam-lock.

(7) Close all four locking levers.

c. Turn off the power to the heaters.

d. Turn off the power to the hypochlorinator.

e. Turn off the pump and close the valves on the water tank(s).

f. Determine the topographical low point in the water distribution system. At this point, disconnect a hose section and permit the water in the hose to drain by gravity. If there is not one clear topographical low point; disconnect the hose at several points to encourage gravity draining.

g. While the hoses are draining, drain the remaining water from the storage tank(s). The location of the tank(s) may not be well suited for emptying their contents in place. You may wish to connect one or more lengths of discharge hose and drain the tanks

away from the hospital. Use the pump to speed up the process. Set the pump up with suction hose, just as when laying the system out. Use as much hose as necessary to drain the tank(s) wherever you wish. **NOTE: Select a drainage location where the slope of the ground will not carry the water into the hospital area. NOTE: As the water storage tank empties, the water pump may become dry and subject to damage. Ensure that the water pump is in the water. Use caution to prevent the pump from running and burning up when the water level in the tank(s) falls below 6 inches.**

h. Once the tank(s) is empty, open the drain cock on the pump and let the pump body drain. Tip the pump up to remove any water remaining in the bottom of the pump body. Leave the drain cock open to allow the pump body to air-dry.

i. While the system is draining, disassemble the hose, starting at the water tank(s).

(1) Remove the gate valves and tee fittings before rolling hoses for storage. Reattach the dust caps and dust plugs to the fittings as you disconnect them. Place the fittings in the Cage, Wire, Folding.

CAUTION
To prevent contaminants from entering the system, reattach dust caps and dust plugs to fittings and hoses before storage.

(2) When rolling hoses, leave the far end of the hose open to allow any remaining water to drain. If possible, keep that end off the ground. If this is not possible, rinse the end of the hose before attaching the dust cap or dust plug.

Figure 3-39
Suggested Method of Rolling 1½ inch Hose

(3) Several lengths of short hose can be rolled as one piece.

(4) 1-inch hose cannot be rolled in the same manner as 1½ inch hose. It must be fed into the cage and coiled in layers. Place one end of the hose against the inside wall and work toward the center of the cage.

j. Remove the hoses from the inside of the Tempers. The instructions here presume that the hose in the TEMPER is part of a secondary loop.

(1) Close all gate valves. This includes the valves to feeder lines, field sinks, and the valves at the beginning and end of the loop.

(2) Disconnect all feeder lines and field sinks from the secondary loop. Leave gate valves attached to the secondary loop.

(3) Disconnect the cam-lock connections immediately outside each end of the TEMPER. Lift one end of the hose and walk it through the TEMPER. Use caution as the fittings could rip the flooring.

CAUTION
Handle the hose inside the TEMPER with care. The fittings may damage the canvas or flooring.

k. As much as possible, store similar fittings together in the cage.

l. Prior to storing the flowmeters and pressure gauges open the caps and plugs on each item and drain the water. Shake any additional water from each item before replacing the caps and plugs. Store them in the Case, Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

m. Advise users of the Hamilton sink to open the drain cock, pressure release valve, and heater drain valve. All of these components are inside the sink base and covered in more detail and discussed in the Hamilton sink operator's manual. These steps allow water to drain from the pump and the heater. This prevents the formation of rust and growth of bacteria.

3-7. Preventive Maintenance.

The following preventative checks and services should be done periodically during operation. They should also be done prior to storing the equipment following completion of a mission or field training exercise.

a. *Water Storage Tanks.* Operator, Maintenance, and PMCS are addressed in the applicable Technical Manuals

b. *Pump.* Operator, Maintenance and PMCS are addressed in TM 5-4320-274-14&P and Chapter 5 of this manual.

c. *Discharge Hose.* Check hoses for abrasions, cuts, and gouges. Check for –

- Presence of bulges or seepage during operations.
- Presence and condition of locking levers.
- Presence and condition of hose clamps.
- Presence of cap and plug attached by chain and key rings.
- Abrasions on cam-lock fittings.
- Presence and condition of gaskets inside the female fittings and caps.

d. *Suction Hose.* Perform the same checks for the discharge hose. The shape of the hose is maintained by steel coils and should be generally round. If the hose is deformed (normally caused by vehicle traffic), use a rubber or lead hammer to restore the cylinder shape of the hose.

e. *Fittings and Valves.* Check –

- For cracks in the body of the fitting or valve.
- For leakage at the threads
- For broken or bent handles on gate valves.

- To ensure that the nut at the top of the rising stem gate valve is secure.

f. *Gauges and Flowmeters.* In addition to functional checks during normal operations, check for –

- Cracked or broken glass.
- The presence of caps and plugs attached by chain and key rings.
- Presence and condition of gaskets inside the female fittings and caps.

3-8. Repair Procedures.

Part of the Water Distribution and Wastewater Management System (WDWWMS) is the WDWWMS Maintenance Set that includes an assortment of repair parts and critical tools to maintain the system. This set is fielded with the remainder of the system. It is the user's responsibility to replenish the components as needed.

a. *Hose.* The repair procedures discussed here applies to both suction and discharge hoses.

(1) *Broken, torn, or punctured hose.* The principal behind repair services for a damaged hose is to make two good hose sections from one damaged one. Dispose of pieces of hose shorter than 2 feet.

(a) Use a hacksaw to cut the hose and remove the damaged portion.

(b) Place two hose clamps (from the maintenance set) over the newly cut end.

(c) Insert a hose coupling in the newly cut end, as far as it will go. The coupling must be the opposite gender of the cam-lock fitting on the other end of the hose.

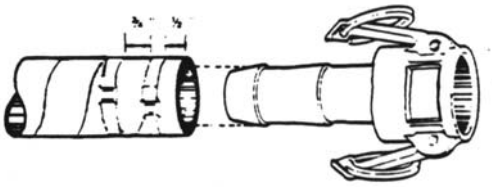


Figure 3-40
Hose Repair

(d) Position the hose clamps near the end of the fitting.

(e) Tighten the hose clamps and trim off the excess.

(f) Attach key rings, chain, and caps (or plugs).

(g) Repeat steps (b) through (f) for the other piece of hose.

b. *Fittings and Valves.* Replace missing or damaged caps, plugs, chains, and rings as needed. The complete fittings and valve assemblies are made up of individual parts that may be requisitioned separately. Should a fitting or valve become unserviceable, retain the serviceable parts for use in reassembling the fitting or valve. This can also be applied to the nozzle, flowmeters and pressure gauge.

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CHAPTER 4

WATER DISTRIBUTION SET (WDS)
Medical Re-Engineering Initiative (MRI) 164 Bed Configuration

OPERATOR, PMCS, AND REPAIR INSTRUCTIONS

4-1. Introduction

a. This chapter describes the assembly, operation, and disassembly of the Water Distribution Set (WDS) (MRI 164-Bed Configuration).

b. The main reason for having a pressurized water distribution system is to control infection and communicable diseases in the hospital. The WDS accomplishes this by starting with covered water storage tanks, pressurizes the water with electric pumps, adds chlorine as necessary, and routes the potable water through a distribution system to designated areas of the hospital.

c. It is necessary that you coordinate early with Preventive Medicine personnel to inspect, take samples from, and analyze the water distribution system. Advise hospital personnel that the water from the system cannot be considered potable until certified by Preventive Medicine personnel.

4-2. Components.

a. *Cam-Lock Connections.* With two exceptions every connection in the water distribution system is connected to similar hoses by use of cam-lock fittings. The exception connects are the field sink adapter and the ISO adapter. Both connections are discussed later in this chapter. Cam-lock is a quick disconnection system that requires no special training or tools. There are no threads on the parts or hoses to be connected. To use cam-lock fittings, the dust cap or plug is removed from each hose end, and then insert the male end fitting into the female end of the other fitting. Pull the levers back towards the hose to cam-lock the two parts together. There are some steps to be followed in making and breaking a hose connection. These steps are discussed later in this manual.

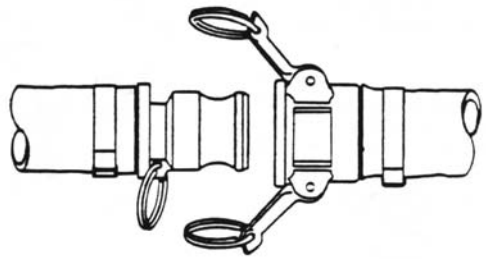

Figure 4-1
Cam-Lock Connection

Water Storage Tanks. Units are authorized the following types and quantities of water storage tanks.

- LIN T12938 – Tank Fabric, Collapsible, 20,000-Gallon Capacity (NSN 5430-01-406-0507)

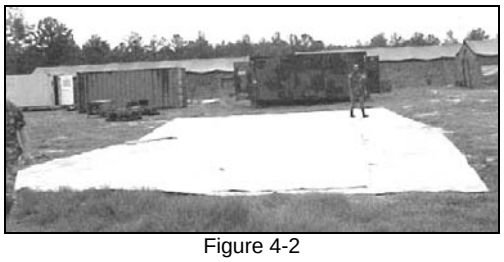

Figure 4-2
Tank Fabric Collapsible, 20,000 Gallon
Laid Out on Ground

Requirements

	T12938
MRI 164 CSH	1

b. *Water Pump.* The water pump used in the WDS (Pump Unit, Centrifugal, 65 GPM [NSN 4320-01-506-4459]) has a 220-volt, 3-phase, totally enclosed, fan-cooled, electric motor. Each water pump is supplied with an integral power cord (40') that terminates in a male Class "L" power connector. The plug interfaces directly with the DEPMEDS electrical distribution system. Each pump is outfitted with a male and female, 1 1/2 inch cam-lock connection. There are two pumps in the WDS. One pump will serve the primary water distribution loop of the hospital, and the other is used to augment or maintain pressure through the secondary loops.

CAUTION
Two persons are required to lift or carry a water pump.

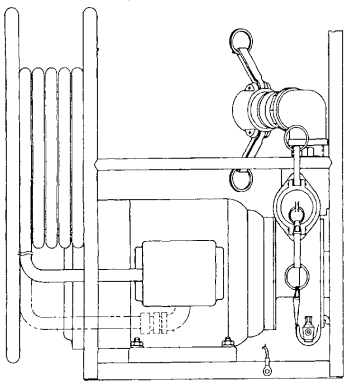

Figure 4-3
Pump Unit, Centrifugal, 65 GPM

c. *Hoses*. The hoses that are contained within the WDS are:

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8338)
PN: 13225E9136-14
5-feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-175-5958)
PN: 13225E9136-12
10-feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-177-3714)
PN: 13225E9136-13
20-feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8337)
PN: 13225E9136-15
50-feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8336)
PN: 13225E9136-17
5-feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-7779)
PN: 13225E9135-9
10-feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8343)
PN: 13225E9136-9
10-feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8341)
PN: 13225E9136-10
20-feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8335)
PN: 13225E9136-18
50-feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-140-6288)
PN: 13225E9136-4
20-feet in length, 4-inch diameter

d. *Fittings and Valves.* There are numerous fittings and valves within the WDS. With two exceptions every fitting in the set has cam-lock connections.

(1) Reducer, 4-inch female, 2-inch male (NSN: 4730-01-064-0560) (PN: AA59326XI-1-9). This reducer is used on the supply side of the Tank, Fabric, Collapsible 20,000 Gallon. It is connected to the end of one of the Hose Assembly, Nonmetallic (NSN: 4720-01-140-6288) PN: 13225E9136-4.

NOTE: Some valves and fitting descriptions are identified with the letter F for female and M for male connections.

(2) Reducer, 4-inch male, 2-inch female (NSN: 4730-01-186-0821) (PN: AA59326XI-1-10). This reducer is used on the return side of the Tank, Fabric, Collapsible 20,000 Gallon. It is connected to one of the Hose Assembly, Nonmetallic (NSN: 4720-01-140-6288) PN: 13225E9136-4.

(3) Valve, Gate, 2-inch female, 1½-inch male (NSN 4820-01-440-8306) (PN: 13229E7178). This valve is attached to the male cam-lock of the Reducer, 4-inch female x 2-inch male (NSN: 4730-01-064-0560, PN: AA59326XI-1-9) which will be used on the Tank Assembly, Fabric Collapsible (20,000 gallon) (LIN: T12938, NSN: 5430-01-406-0507).

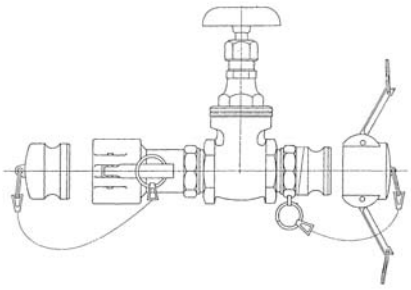

Figure 4-4
Valve, Gate, 1½-inch F, 2-inch M

(4) Valve, Check, 1½- inch female, 2-inch male (NSN: 4820-01-440-5919, PN: 13229E7197). This valve is attached to the female cam-lock of the Reducer, 4-inch male, 2-inch female (NSN: 4730-01-186-0821) (PN: AA59326XI-1-10) that will be used on the Tank Assembly, Fabric Collapsible (20,000 gallon) (LIN: T12938, NSN: 5430-01-406-0507).

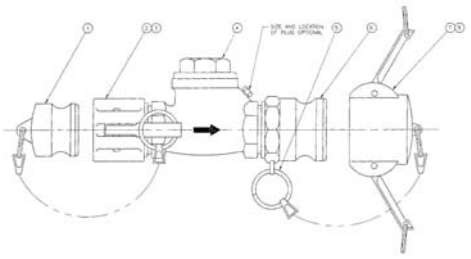

Figure 4-5
Valve, Check, 1½ inch F, 2- inch M

(5) Valve, Globe, 1½-inch F, 1½-inch M (NSN: 4820-01-440-8765, PN: 13229E7169). This valve is attached to the 1½- inch loop, immediately after the beginning of a 1-inch loop. In this application, the valve is manually adjusted to control the rate of flow in the system.

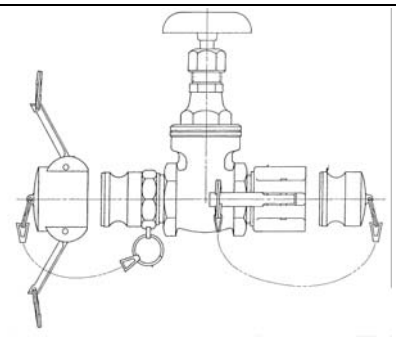

Figure 4-6
Valve, Globe, 1½-inch F, 1½-inch M

(6) Valve, Gate, 1- inch F x 1-inch M (NSN: 4820-01-440-7798, PN: 13229E7167). When used with individual water users, such as field sinks and nozzles, this valve controls the rate of flow. It is also used at the beginning of secondary loops and long one-way water lines. Used this way, repairs or changes in the secondary loops can be made without interrupting water supply to the rest of the hospital.

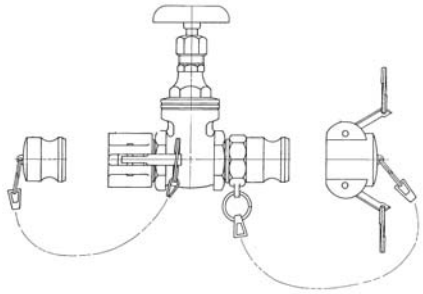

Figure 4-7
Valve, Gate, 1-inch F, 1-inch M

(7) Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x 1-inch M (NSN: 4730-01-440-4609, PN: 13229E7172). This fitting is used at each place where the one-way feeder lines branch off to the individual users, such as CMS, pharmacy, X-Ray, laboratory, etc. It is also used at the beginning and end of the secondary loop.

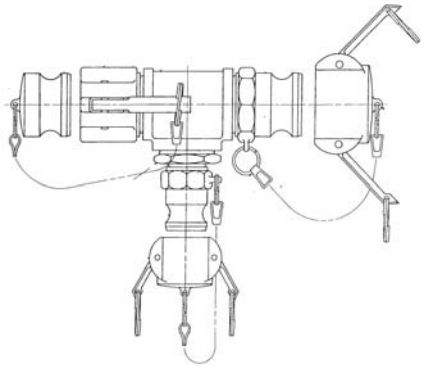

Figure 4-8
Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x 1-inch M

(8) Tee Assembly, Quick Disconnect, 1-inch F, 1-inch M, 1-inch M (NSN: 4730-01-440-4091, PN: 13229E0361). This fitting allows connection of the individual users along secondary loops or long one-way lines.

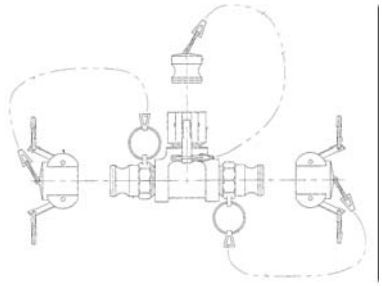

Figure 4-9
Tee Assembly, Quick Disconnect, 1-inch F, 1-inch M, 1-inch M

(9) Tee Assembly, Quick Disconnect, 1½-inch M, 1½-inch M, 1½-inch F (NSN: 4730-01-440-4633, PN: 13229E7182). This fitting is used on the return side of the primary loop.

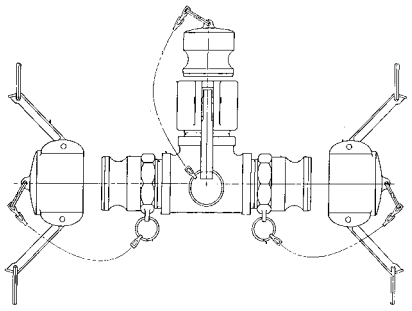

Figure 4-10
Tee Assembly, Quick Disconnect, 1½ inch M, 1½-inch M, 1½-inch F

(10) Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x 1-inch M (NSN: 4730-01-440-4613, PN: 13229E7174).

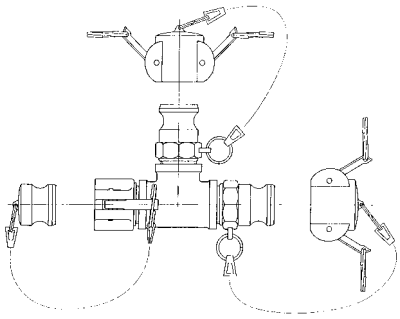

Figure 4-11
Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x 1-inch M

(11) Tee Assembly, Quick Disconnect, 1½-inch F, 1½-inch M x ¼-inch Male (NSN: 4730-01-487-3575) is used to connect the Hypochlorination Unit (NSN: 4610-01-435-4884) (PN: WAL-1031-96) to the primary loop.

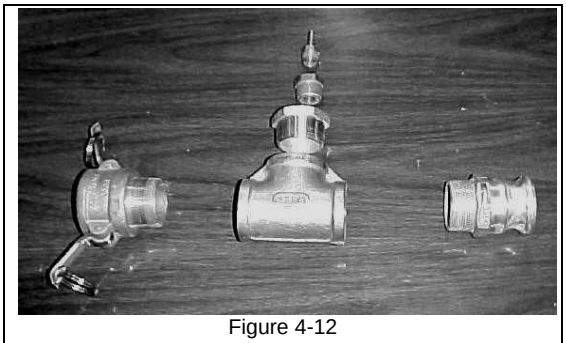

Figure 4-12
Tee Assembly, Quick Disconnect, 1½-inch F, 1½- inch M x ¼- inch M

(12) Coupling Assembly, Quick Disconnect, 1-inch F x 1-inch F (NSN: 4730-01-440-8569, PN: 13229E7173). This coupling assembly is commonly referred to as a “Gender Changer”. It is used when a male outlet is connected to a second male connection and as a connection on the Hamilton Sink connections for the ISO containers.

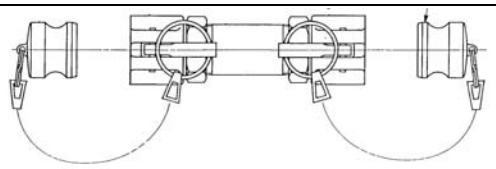

Figure 4-13
Coupling Assembly, Quick Disconnect, 1-inch F x 1-inch F

(13) Plug, Quick Disconnect (NSN: 4730-01-415-6403, PN: 13229E7170). This fitting is used in conjunction with Adapter, Straight Hose to Boss (NSN: 4730-01-415-6420, PN: 13229E7195) to connect field sinks to the water loop.

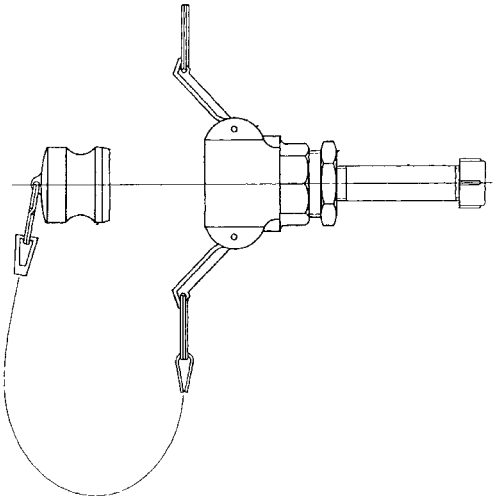

Figure 4-14
Plug, Quick Disconnect

(14) Adapter, Straight Hose to Boss (NSN: 4730-01-415-6420, PN: 13229E7195). This fitting is used in conjunction with Plug, Quick Disconnect (NSN: 4730-01-415-6403, PN: 13229E7170) to connect field sinks to the water loop. This is the first example where both connections are not cam-lock. This fitting allows a “garden hose” type fitting to be connected to the system.

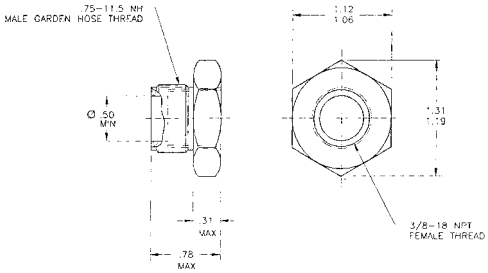

Figure 4-15
Adapter, Straight Hose to Boss

(15) Reducer Quick Disconnect, 1-inch F to 1½-inch M (NSN: 4730-01-499-8752) (PN: 3629). This fitting is used to connect the Heater, Water, 9,000 Watts (NSN: 4520-01-493-7423) (PN: 111739) to the secondary potable water distribution lines.

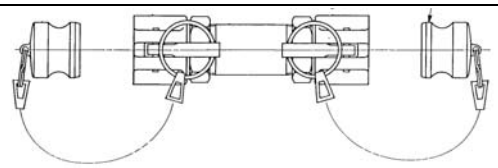

Figure 4-16
Reducer, Quick Disconnect
1-inch Female, 1½ inch Male

(16) Reducer Quick Disconnect, 1½-inch F, 1-inch M (NSN: 4730-01-499-8787) (PN: 3630). This fitting is used to connect the Heater, Water, 9,000 Watts (NSN: 4520-01-493-7423) (PN: 111739) to the secondary potable water distribution lines.

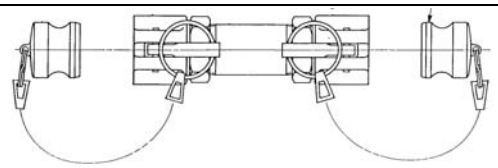

Figure 4-17
Reducer, Quick Disconnect
1½ inch Female, 1-inch Male

e. Other Components

(1) Pipe Assembly, Potable Water (NSN: 4610-01-440-4086, PN: 13229E7162). This component measures the water pressure in the distribution system. This gauge is generally placed at the return end of the main loop. Its precise location depends on how the tanks are employed. **THE PRESSURE GAUGE IS FRAGILE.** When not in use, store it in the Case Medical Instrument and Supply (NSN: 6545-01-499-5676, PN: 02-1038).

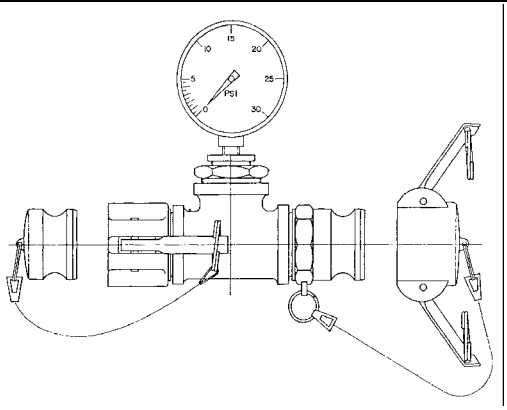

Figure 4-18
Pipe Assembly, Potable Water
(Pressure Gauge)

(2) Pipe Assembly, Potable Water (NSN: 4610-01-440-4088, PN: 13229E7165). The water distribution system uses a flow meter that measures flow rates up to 100 GPM. It is placed at the end of the primary loop, immediately before the pressure gauge. **FLOW METERS ARE FRAGILE.** When not in use, store them in the Case, Medical Instrument and Supply (NSN: 6545-01-499-5676, PN: 02-1038).

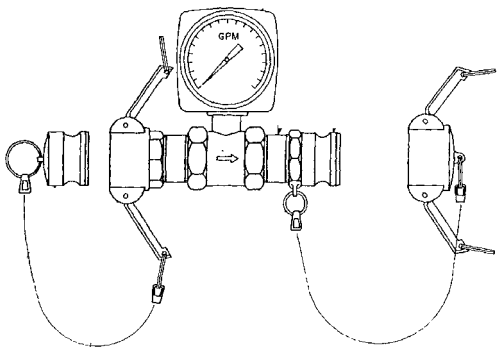

Figure 4-19
Pipe Assembly, Potable Water
(Flowmeter)

(3) Indicator Assembly (NSN: 4610-01-440-4090, PN: 13229E7163). This assembly is used to monitor water flow through the distribution system. **THIS ASSEMBLY IS FRAGILE.** When not in use, store it in the Case, Medical Instrument and Supply (NSN: 6545-01-499-5676, PN: 02-1038).

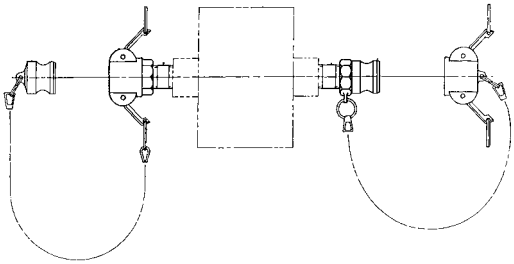

Figure 4-20
Indicator Assembly

(4) Case, Medical Instrument and Supply (NSN: 6545-01-499-5676, PN: 02-1038). This case is used to store the pressure gauges, flow meters, indicator assembly and color comparator.

(5) Comparator, Color (NSN: 6630-01-044-0334, PN: U25377). The comparator is used by the equipment operator to visually

determine the turbidity of the supplied water.

(6) Stand Assembly, Distribution Nozzle (NSN: 4930-01-120-7426, PN: 13225E9140). This assembly is used to suspend the Nozzle Assembly, Water (NSN: 4610-01-440-8834, PN: 13229E7168).

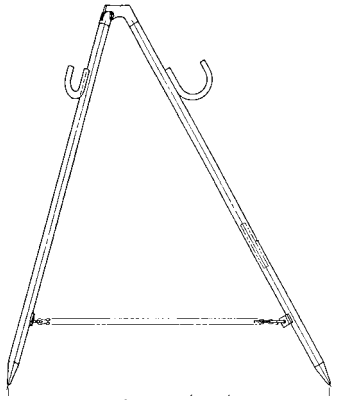

Figure 4-21
Stand Assembly, Distribution Nozzle

(7) Nozzle Assembly, Water (NSN: 4610-01-440-6834, PN: 13229E7168). The nozzle is provided to supply water to those parts of the hospital that are not connected to the water distribution system. Other uses for this nozzle are outlined in the principles of installation section of this chapter.

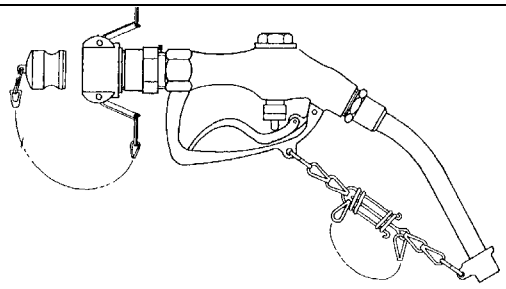

Figure 4-22
Nozzle Assembly, Water

(8) Strainer, Sediment (NSN: 4730-01-440-7662, PN: 13229E7179). This fitting is used to strain or remove large particles that could damage the water pumps in the water distribution system.

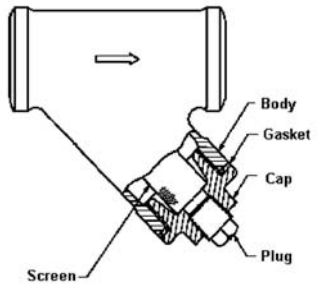

Figure 4-23
Strainer, Sediment

(9) Skip Box, Materiel Handling (NSN: 3990-01-505-5922, PN: W-2-404-836-SP-SJF). This device is used for the storage of fittings and hoses within the water distribution set.

Figure 4-24
Skip Box, Materiel Handling

(10) Pump Unit, Centrifugal (NSN: 4320-01-506-4459, PN: 13229E7159). The water pumps are supplied with the water distribution set. The water pumps are outfitted

with quick-disconnect (cam-lock) fittings, and are rated at producing a 65 GPM water flow.

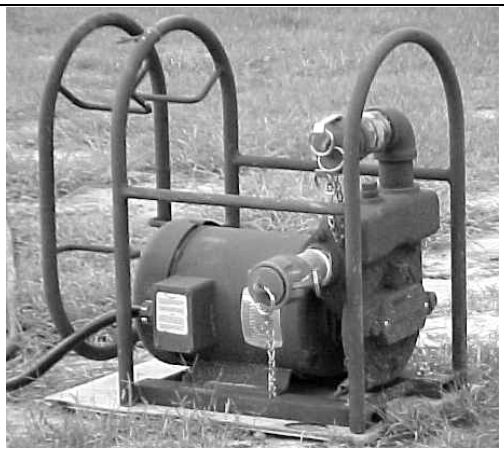

Figure 4-25
Pump Unit, Centrifugal, 65GPM

(11) Hypochlorination Unit (NSN: 4610-01-435-4884, PN: WAL 1031-96). This item is designed to treat and chlorinate the water within the water distribution system. The addition of chlorine-based material to the water supply helps retard bacterial and fungal growth within the hoses. It is also designed to provide the capability to flush (hyper-chlorinate) the water lines.

Figure 4-26
Hypochlorination Unit

(12) Can, Water, Military (NSN: 7240-00-089-3827, PN: MIL-C-43613). This water can is provided for mixing the Sodium hypochlorite (NaOcl) for the Hypochlorination Unit.

(13) Heater, Water, 9,000 Watts (PN: PWH). The, in-line water heater is provided for use of the system during cold weather operations. The heater is not intended to provide “hot” water, but raises the ambient temperature of the water in the hose lines by a few degrees to prevent freezing.

Figure 4-27
Heater, Water, 9,000 Watts

2-3 Principles of Installation

The water distribution set is intended to be as flexible in its layout as the DEPMEDS Combat Support Hospital itself. **THERE IS NO ONE "CORRECT WAY" TO SET UP THE WATER DISTRIBUTION SET.** The number of possible working configurations is almost unlimited. The information within this section provides the basic guidelines necessary for planning the layout for your hospital. Like other large footprint systems, the layout of the WDS must be planned in advance. Obtain a copy of the hospital layout as soon as possible, to determine the best locations (to ensure access to refill the tank(s)) for the major component, the water storage tank(s).

a. Location of Tank(s), Fabric Collapsible. Setting the tank(s) fabric, collapsible is the most important decision in setting up the water distribution set. There are a number of factors to consider.

(1) *Traffic Flow.* Trucks delivering water need access to the tank(s).

(2) *Electric Power.* The Pump Assembly, Centrifugal (NSN: 4320-01-440-4421), the Hypochlorination Unit (NSN: 4610-01-435-4884) and two Heaters, Water, 9,000 Watts (NSN 4520-01-493-7423) are placed near the tank(s) and they need electric power. The electric cables for pump assembly and heaters are 40 feet long.

(3) *Proximity of the Primary Loop.* The water distribution set is designed for the primary loop to be near the highest concentration of ISOs.

(4) *Sufficient Area.* The water distribution set comes with one Tank, Fabric Collapsible, 20,000 gallon. Each of these tanks is 27.2 feet long and 27.2 feet wide.

c. Location of the Primary Loop. The ISOs make up the largest number of water users in the hospital. As such, they use a large amount of water. Fore this reason, the primary loop should make its circuit around the highest concentration of ISOs. This approach also has the advantage of reducing the length of the primary loop, as well as reducing the amount of hose needed to connect the ISOs. The length of the primary loop is dictated by the number of hospital components being used, and their configuration.

d. Secondary Loop(s) Secondary loops are normally installed instead of long one-way water lines. Water constantly moves in the secondary loops. This greatly

reduces the amount of stagnant water, and the potential of bacterial and fungal growth. Flowing water stays cooler longer in summer, and resists freezing in winter.

e. Water Distribution Nozzles. The Nozzle Assemblies, Water, (NSN: 4610-01-440-6834) have several applications in the DEPMEDS, Combat Support Hospital.

(1) An important application of the nozzle assembly is to supply water to those areas of the hospital that are not connected to the water distribution set.

(2) The nozzle assembly is an efficient way of filling the autoclaves. Locate a nozzle, with Stand Assembly, Distribution Nozzle (NSN: 4930-01-120-7426) in the vicinity of the Central Materiel Supply (CMS) TEMPER. The hand valve of the nozzle is not very sensitive to small adjustments and tends to give large quantities of water. For this reason you should install a 1 inch female-male Valve, Gate (NSN: 4820-01-440-7798, PN: 13229E7167) in the line leading to the nozzle assembly. Set the gate valve volume to reduce or adjust the flow of the water at the nozzle assembly. Adding this control feature should be at any location where excessive water is a potential problem. Locate the valve 20 feet or so away from the nozzle assembly to enable you to adjust overall flow without moving the valve.

f. Pedestrian and Vehicle Routes. Hoses should not cross vehicle routes. Hoses in pedestrian paths should be kept to a minimum. If a hose must cross a TEMPER, do so in a corridor, and use a Channel, Hose Protector (NSN: 4720-01-440-4925 PN: 13229E7176 or NSN: 4720-01-440-4928 PN: 13229E7175) (Both of these types of channel protectors are contained in the Waste-Water Augmentation Set, Hospital, MF2K.

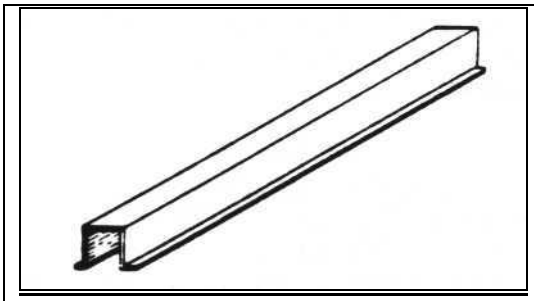

Figure 4-28
Channel, Hose Protector (Subsurface)
NSN: 4720-01-440-4925

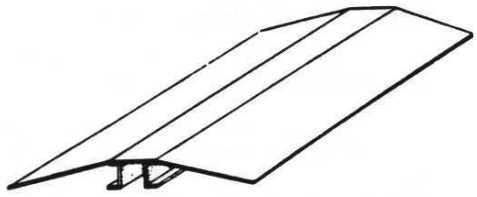

Figure 4-29
Channel, Hose Protector (Surface)
NSN: 4720-01-440-4928

g. Location of In-Line Water Heaters. The in-line water heaters, supplied with this set are designed to keep the ambient temperature of the water within the hoses and bladders above freezing. The system is designed to have 4 heaters per primary loop, and 4 heaters per secondary loop. They come with cam-lock, quick disconnect fittings, and can be placed a various locations along the loop run. When planning on your setup, remember that these heaters require 208 Volts, AC electrical power and consequently must be located within 40 feet of a power distribution center (PDC). Also, the heaters should be placed as equally as possible along each loop.

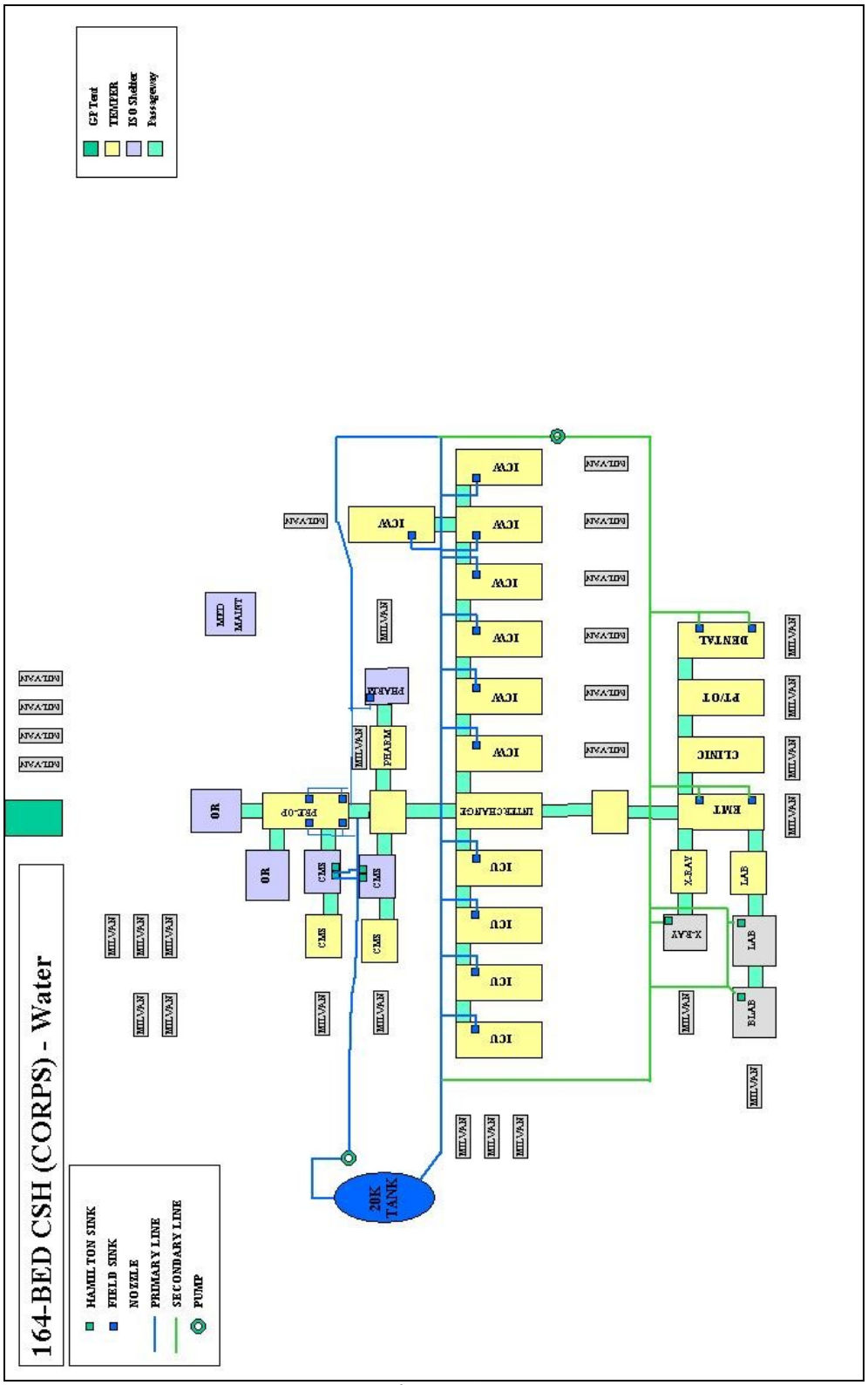

Figure 4-30
Recommended Water Distribution Layout for MRI 164-Bed Configuration

2-4. Assembly. This section provides general guidance and some hard rules on how to assembly the water distribution set. Prior to assembly of the WDS, you should determine the layout of the water distribution set based on the information of previous paragraphs, and the Commander's desired hospital layout. It is helpful to sketch the layout of the water distribution set over the layout diagram of the hospital.

a. Assemble the tank(s) fabric, collapsible, 20,000 Gallon. Locate them using the information in paragraph 2-3a.

(1) Attach one Hose Assembly, Nonmetallic [4-inch x 20-feet] (NSN: 4720-01-140-6288) to the outlet port of the tank and one Hose Assembly, Nonmetallic [4-inch x 20-feet] (NSN: 4720-01-140-6288) to the inlet port of the tank.

(2) Attach the Reducer, Quick Disconnect [4-inch F x 2-inch M] (NSN: 4730-01-064-0560) to the Hose Assembly, Nonmetallic [4-inch x 20-feet] (NSN: 4720-01-140-6288) on the outlet port of the tank

(3) Attach the Reducer, Quick Disconnect [4-inch M x 2-inch F] (NSN: 4730-01-186-0821) to the Hose Assembly, Nonmetallic [4-inch x 20-feet] (NSN: 4720-01-140-6288) on the inlet port of the tank

(4) Attach the Valve, Gate [2-inch F x 1½-inch M] (NSN: 4820-01-440-8306) to the Reducer, Quick Disconnect [4-inch F x 2-inch M] (NSN: 4730-01-064-0560) on the outlet port of the tank. **(MAKE SURE THE VALVE IS TURNED OFF.)**

(5) Attach the Valve, Gate [1½-inch F x 2-inch M] (NSN: 4820-01-440-8302) Reducer, Quick Disconnect [4-inch M x 2-inch F] (NSN: 4730-01-186-0821) on the inlet port of the tank. **(MAKE SURE THE VALVE IS TURNED OFF.)**

b. Attach the filter assembly. The location of the filter assembly depends on the configuration of the tanks. But, it should be located between the outlet port of the tank and the Pump Assembly, Centrifugal.

c. Connect the suction hose (1½-inch x 10-feet) between the pump and the assembly for the outlet port of the tank and the pump.

d. Select open 40-60 Ampere female connections on the power distribution panel (PDC). **MAKE SURE THE CIRCUIT BREAKER ON THE PDC IS OFF**. Connect the water pump's and the heaters' electrical plugs to the selected receptacles on the PDC.

NOTE

Do not power any pump until the water system is connected.

NOTE

Do not turn on the heaters until the water system is connected, and water is being pumped.

e. Lay the primary loop following the guidance in paragraph 4-3c. **DO NOT CONNECT ANY HOSES AT THIS TIME. DO NOT REMOVE THE CAPS OR PLUGS.** Be aware of the requirement of fittings near the ISO Container walls that have water receptacles. Connections between hoses in the primary loop should occur near these points. Also be aware of other requirements for breaks in the loop, such as secondary loops, feeder lines to individual users, nozzles to CMS, and inclusion of the Heater, Water, 9,000 Watts at various points in the primary and secondary loop(s).

f. Lay the 1-inch hose for the feeder lines between the main loop and the ISOs. This process more clearly defines the needs for breaks in the primary loop and for fittings. The CMS ISO has two water receptacles. All other ISOs have one water receptacle (except for OR, which has none) Place a 1-inch gate valve (NSN: 4820-01-440-7798) next to the tee assembly (NSN: 4730-01-440-4609). Placing the valve here enables you to disconnect an individual ISO without disrupting water supply to the rest of the hospital.

g. Lay the fittings and hose for the secondary loop(s). The beginning of each secondary loop of each secondary loop is configured by using the following components at the beginning of the loop.

(1) Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x 1-inch M (NSN: 4730-01-440-4609, PN: 3229E7172), and

(2) Valve, Gate, 1-inch F x 1-inch M (NSN: 4820-01-440-7798, PN: 13229E7167).

h. The return side of each secondary loop is configured by using the following components at the end of the loop.

(1) Valve, Gate, 1-inch F x 1-inch M (NSN: 4820-01-440-7798, PN: 13229E7167), and

(2) Tee Assembly, Quick Disconnect, 1½-inch F x 1½-inch M x 1-inch F (NSN: 4730-01-440-4931, PN: 13230E5716).

i. Lay the necessary fittings and hose to connect the field sinks.

j. Lay hose lines to the nozzle locations. Place one nozzle next to each CMS tent. These hose lines need enough slack so that the nozzle can reach each autoclave. **Place the 1-inch gate valve far enough away from the nozzle so that when the nozzle and hose are moved, the gate valve is not dragged.**

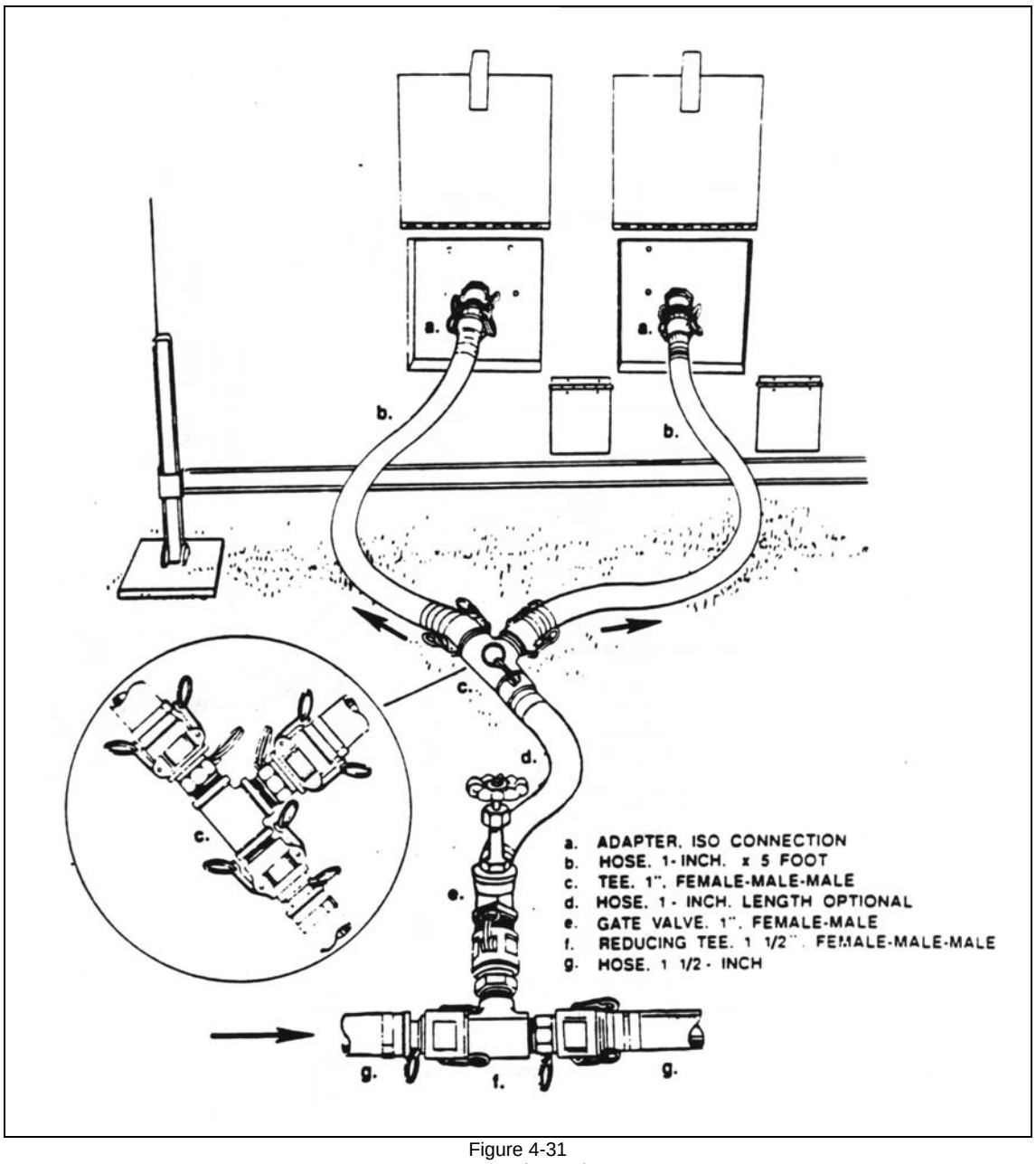
a. ADAPTER, ISO CONNECTION
b. HOSE, 1-INCH, x 5 FOOT
c. TEE, 1", FEMALE-MALE-MALE
d. HOSE, 1-INCH, LENGTH OPTIONAL
e. GATE VALVE, 1", FEMALE-MALE
f. REDUCING TEE, 1 1/2", FEMALE-MALE-MALE
g. HOSE, 1 1/2-INCH

Figure 4-31
Water Hose Connection to the CMS ISO

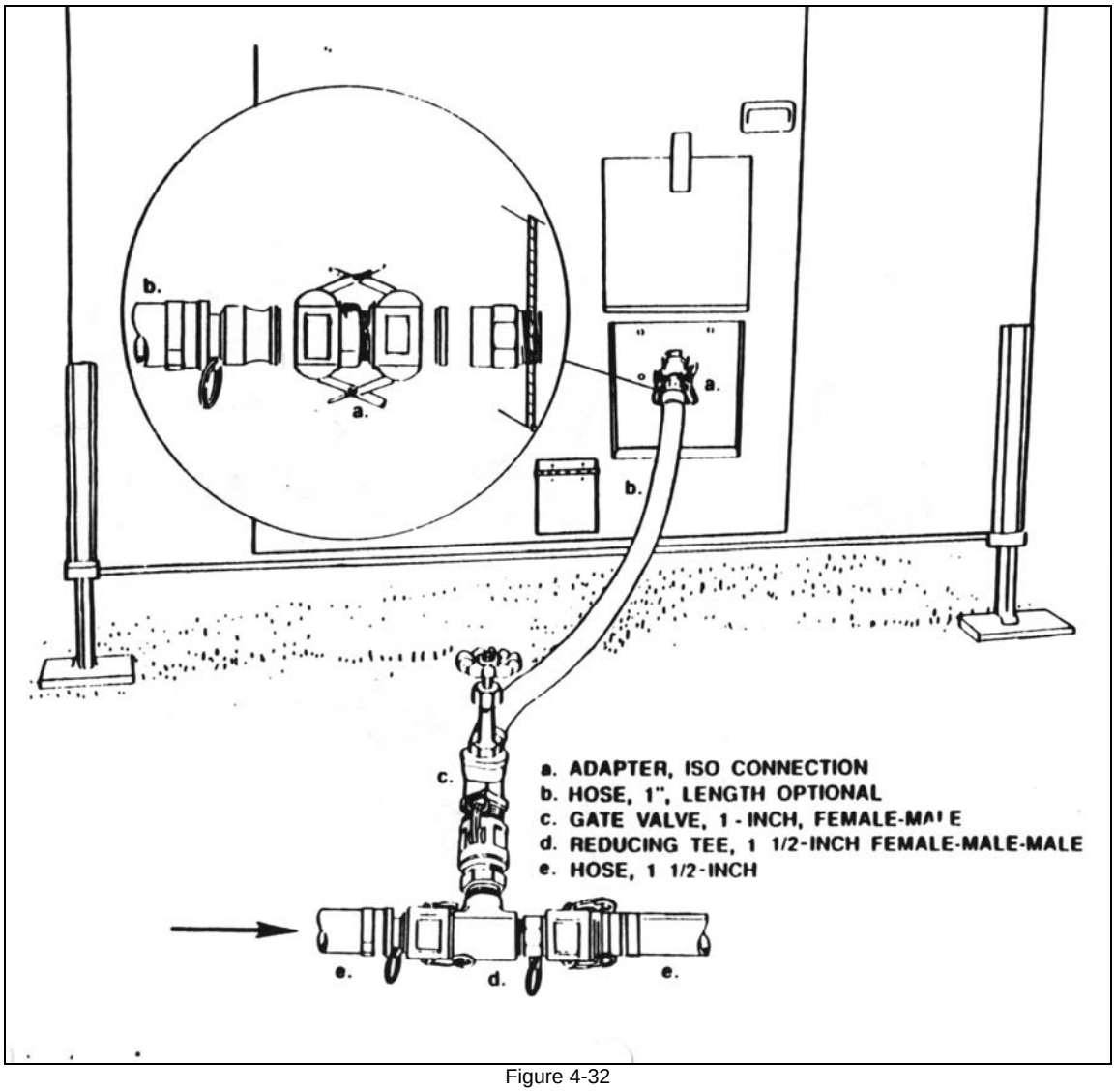

Figure 4-32
Connection to a Single Receptacle ISO (with hose)

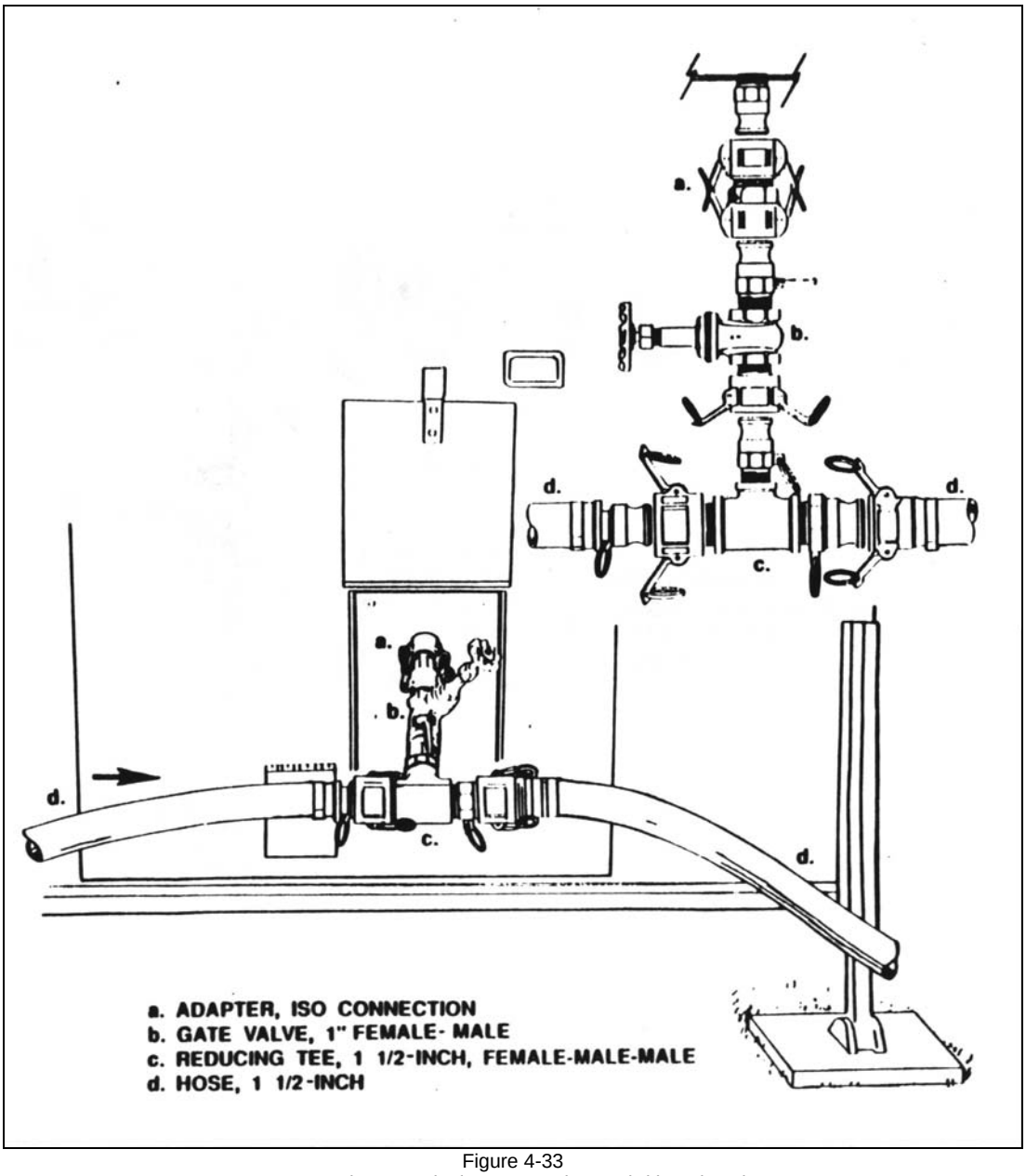

Figure 4-33
Connection to a Single Receptacle ISO (without hose)

k. Use the hose protection channels for hose that will cross TEMPER corridors. If conditions and time permit you may bury the hose and the channel protector, but it is not necessary. Run the hose under the edge of the tent flap and both layers of the floor. You may need to untie the floor tie-downs. Place the protective channel over a hose connection.

l. With the system laid out prepare for the assembly. Correct assembly of the hoses and cam-lock fittings is easier if the fittings are clean. Dirty or mud-encrusted connections must be cleaned off prior to assembly. **It is absolutely**

essential to avoid contaminating the inside of the hoses and fittings. Follow the procedure below as closely as possible.

CAUTION
Correct assembly of connections is essential to avoid contaminating the system.

(1) Open the locking levers for both cam-lock connectors. **DO NOT REMOVE THE FEMALE DUST CAP OR MALE DUST PLUG.**

(2) Place the female connector on an elevated surface (such as the toe of your boot), that allows the opening of the fitting to be face up, or off the ground. This procedure, which applies to all connections, reduces the chance of contaminants entering the fitting.

(3) Lay the male fitting across the female fitting.

(4) Remove the dust plug from the female fitting.

(5) Holding the dust plug in your hand, remove the dust cap from the male fitting.

(6) Connect the dust plug and dust cap to each other. Close the locking levers and lay them on the ground.

(7) Connect the male and female hose connectors or valve fittings without allowing the fittings to touch the ground. Close the locking levers.

(8) If you find dirty connections during the assembly process, ensure that they are cleaned prior to assembly.

(9) Use this procedure to make all the connections in the system. One exception is the connection at the ISO. The male fitting on the ISO does not have a dust cap. Because of this, the dust plug from the female-female adapter will not have a matching connection.

Final checks to be done **BEFORE TURNING ON THE WATER.**

(1) Open all gate valves in the primary and secondary loop(s), and to the nozzles and ISOs.

(2) Close all valves to the field sinks.

(3) Close the globe valves on the Interior wall panel of the ISO. Ensure the Hamilton sinks are ready by closing the:

(a) Drain cock on the pump.

(b) Valve at the top of the pump body.

(c) Heater drain valve.

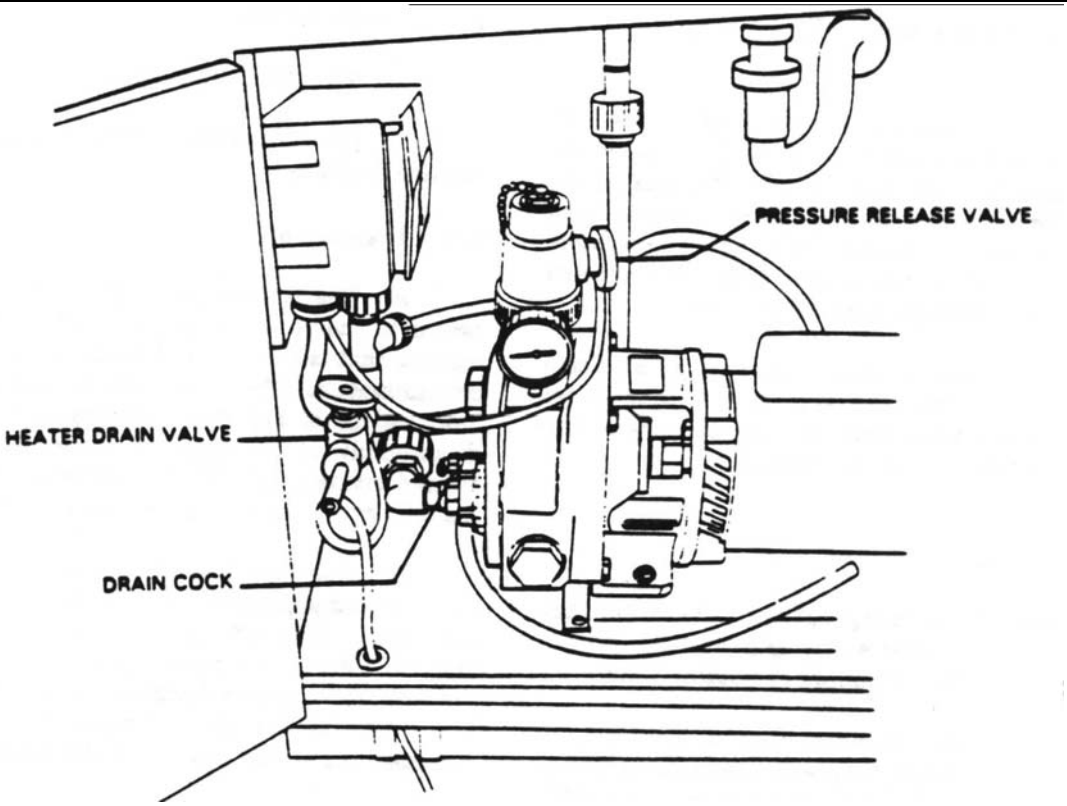

Figure 4-34
Hamilton Sink Connection

(4) Make sure that the field sinks are ready. Instruct users of the field sinks connected to the system to set them up for gravity operation in accordance with the manufacturer's literature.

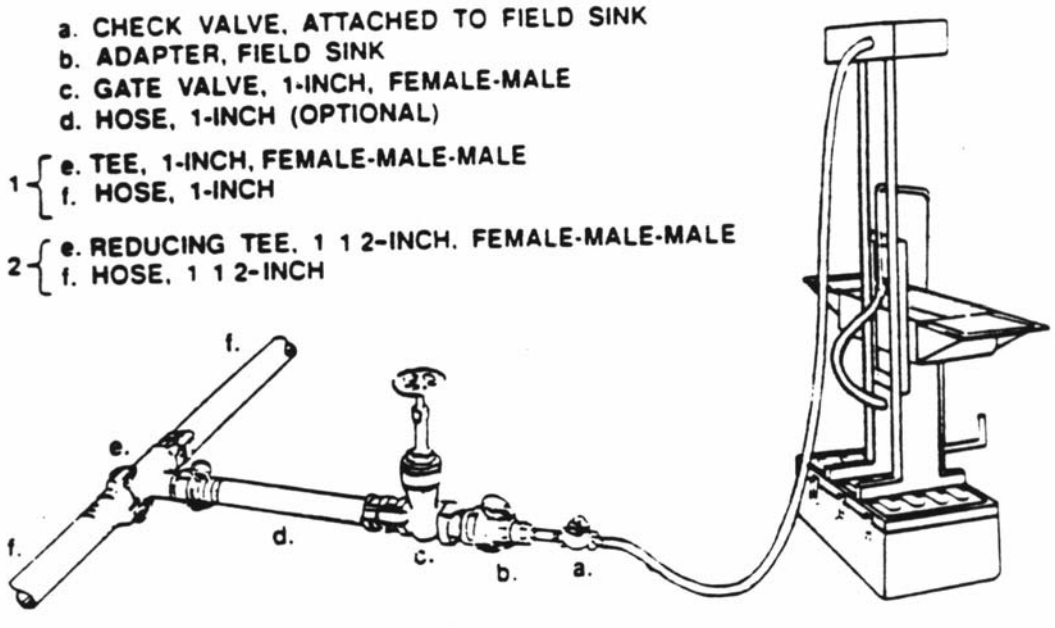

Figure 4-35
Field Sink Connection

(5) With water in the storage tank(s) and all of the connections made:

(a) Open the valve on the storage tank immediately before the pump.

(b) Remove the nut at the top of the pump assembly body. Refer to TM 5-4320-274-14&P. With a water tank full of water the pump will prime itself. Removing the nut allows air to escape: water fills the pump body. Once water has reached the nut opening, replace the nut and tighten firmly.

(c) Open the gate valve at the return side of the water tank. If you are using more than one tank, open the valves between the tanks.

(d) Turn on the circuit for the pump.

(e) Turn on the circuit for the Hypochlorinator.

(f) Turn on the circuits for the in-line water heaters.

m. Adjust the rate of flow at the return side of the distribution system. Adjust the rate of flow with the gate valve so that the pressure gauge reads between 8 and 12 pounds per square inch (psi).

n. Adjust the flow at the secondary loop(s). The presence of water in the secondary loop(s) does not mean that water is flowing through the loop(s). To ensure water is flowing, gradually close the 1½-inch gate valve. Continue closing the

valve until the flowmeter reads between 5 and 10 gallons per minute.

o. Return to the gate vale by the pressure gauge. After adjusting the flow for the secondary loop(s), the flow rate here may need to be adjusted. Use the gate valve to adjust the rate of flow until the pressure gauge reads between 8 and 12 psi.

p. Go to each Hamilton sink. Instruct the users to double-check that the sinks are ready. Have them open the globe valve on the ISO wall. Turn on the water. The initial water from the faucet may appear rusty. This is rust that was on the inside of the body of the pump in the Hamilton sink. Allow the water to run until the water clears.

q. Go to each field sink connected in the water distribution system. Instruct the users to open the gate valve, but not all the way. If there are any leaks anywhere but at the threaded fittings, defer the sink to maintenance. Users can correct leaks at the fittings by tightening them with a pair of pliers. It is up to the user to adjust the rate of flow to the sink with the gate valve.

r. Before the water is used, direct the field sanitation team to test the chlorine in the water storage tank(s). Then operate **EVERY** sink in the system for three to five minutes. Operate each nozzle for one minute. This flushes the system of potential contaminants that may have entered the hoses and fittings since last use.

s. Coordinate with preventive medicine personnel to inspect the system and take water samples. Coordinate also with regular preventive medicine for regular inspections and sampling.

2-5. Operation

The purpose of this paragraph is to ensure that the equipment is operated safely and that the system provides a continuous supply of potable water.

a. Monitor the water supply. Turn off the pump when the depth of water in the water tank is less than 8 inches. The bearings in the water pump will burn out if the pump impeller is not covered with water.

b. The field sanitation team should monitor the chlorine residual in the water supply. Measure chlorine residual at the water tank(s), and 20 percent (20%) of the sinks and nozzles in the distribution system daily. A chlorine residual is essential for preventing biological contamination. However, too high a chlorine residual will make the water taste bad.

c. Remove and clean the filter in the filter assembly daily. This requires shutting down the pumps, hypochlorinator and heaters. In order to minimize downtime, have a clean filter ready for immediate installation. Follow the procedure below to change the filter.

(1) Turn off power to the heaters.

(2) Turn of power to the hypochlorinator.

(3) Turn off the power to the pumps.

(4) Close the gate valve by the filter assembly.

(5) Change filters in the filter assembly.

(6) Open the gate valve.

(7) Prime the pump.

(8) Turn on the power to the pump.

(9) Turn on power to the hypochlorinator.

(10) Turn on power the power to the heaters.

(11) Clean the old filter and place it in the storage container.

2-6. Disassembly.

a. The procedures discussed here will enable you to disassemble the system in a manner that is efficient and minimizes the chance of contamination. The procedure is intended to be independent of any other actions associated with the disassembly of the hospital. However, hose lines located inside a TEMPER must be removed before the tent can be disassembled.

b. Disconnecting the cam-lock fittings is **not** the first thing done in disassembly. However, it is the most frequent task and warrants being discussed first. This procedure is not the reverse of the assembly process previously discussed. The intent is the same though; disconnect with minimal risk of contaminating the system.

(1) Unlock all four locking levers.

(2) Separate the fittings. Rest the female fitting on a protective surface (**NOT ON THE GROUND)** with its opening up. The toe of your boot will work.

(3) Lay the male fitting on the female fitting (or hose) in a way that prevents the male fitting from making contact with anything else.

(4) Separate the dust cap and dust plug. **DO NOT PLACE THEM ON THE GROUND.**

(5) Holding the dust plug, place the dust cap on the male fitting of the cam-lock.

(6) Place the dust plug in the female fitting of the cam-lock.

(7) Close all four locking levers.

c. Turn off power to the heaters.

d. Turn off power to the hypochlorinator.

e. Turn off the pump and close the valves on the water tank(s).

f. Determine the topographical low point in the water distribution system. At this point, disconnect a hose section and permit the water in the hose to drain by gravity. If there is not one clear topographical low point, disconnect the hose at several points to encourage gravity draining.

g. While the hoses are draining, drain the remaining water from the storage tank(s). The location of the tank(s) may not be well suited for emptying their contents in place. You may wish to connect one or more lengths of discharge hose and drain the tanks away from the hospital. Use the pump to speed up the process. Set the pump up with suction hose, just as when laying the system out. Use as much hose as necessary to drain the tank(s) wherever you wish.

NOTE: Select a drainage location where the slope of the ground will not carry the water into the hospital area.

NOTE: As the water storage tank empties, the water pump may become dry and subject to damage. Ensure that the water pump is in the water. Use caution to prevent the pump from running and burning up when the water level in the tank(s) falls below 6 inches.

h. Once the tank(s) is empty, open the drain cock on the pump and let the pump body drain. Tip the pump up to remove any water remaining in the bottom of the pump body. Leave the drain cock open to allow the pump body to air-dry.

i. While the system is draining, disassemble the hose, starting at the water tank(s).

(1) Remove the gate valves and tee fittings before rolling hoses for storage. Reattach the dust caps and dust plugs to the fittings as you disconnect them. Place the fittings in the Cage, Wire, Folding. Put similar fittings in the same cage.

CAUTION
To prevent contaminants from entering the system, reattach dust caps and dust plugs to fittings and hoses before storage.

(2) When rolling hoses, leave the far end of the hose open to allow any remaining water to drain. If possible, keep that end off the ground. If this is not possible, rinse the end of the hose before attaching the dust cap or dust plug.

Figure 4-36
Suggested Method of Rolling 1½- inch Hose

(3) Several lengths of short hose can be rolled as one piece.

(4) 1-inch hose cannot be rolled in the same manner as 1½-inch hose.

j. Remove the hoses from the inside of the Tempers. The instructions here presume that the hose in the TEMPER is part of a secondary loop.

(1) Close all gate valves. This includes the valves to feeder lines, field sinks, and the valves at the beginning and end of the loop.

(2) Disconnect all feeder lines and field sinks from the secondary loop. Leave gate valves attached to the secondary loop.

(3) Disconnect the cam-lock connections immediately outside each end of the TEMPER. Lift one end of the hose and walk it through the TEMPER. Use caution as the fittings could rip the flooring.

CAUTION
Handle the hose inside the TEMPER with care. The fittings may damage the canvas or flooring.

k. As much as possible, store similar fittings in the same cage.

l. Prior to storing the flowmeters and pressure gauges, open the caps and plugs on each item and drain the water. Shake any additional water from each item before replacing the caps and plugs. Store them in the Case, Medical Instrument and Supply (NSN: 6545-01-499-5676, PN: 02-1038).

m. Advise users of the Hamilton sink to open the drain cock, pressure release valve, and heater drain valve. All of these components are inside the sink base and covered in more detail and discussed in the Hamilton sink operator's manual. These steps allow water to drain from the pump and the heater. This prevents the formation of rust and growth of bacteria.

2-7. Preventive Maintenance.

The following preventative checks and services should be done periodically during operation. They should also be done prior to storing the equipment following completion of a mission or field training exercise.

a. *Water Storage Tanks.* Operator, Maintenance, and PMCS are addressed in the applicable Technical Manuals

b. *Pump.* Operator, Maintenance and PMCS are addressed in TM 5-4320-274-14&P and Chapter 5 of this manual.

c. *Discharge Hose.* Check hoses for abrasions, cuts, and gouges. Check for –

- Presence of bulges or seepage during operations.
- Presence and condition of locking levers.
- Presence and condition of hose clamps.
- Presence of cap and plug attached by chain and key rings.
- Abrasions on cam-lock fittings.
- Presence and condition of gaskets inside the female fittings and caps.

d. *Suction Hose.* Perform the same checks for the discharge hose. The shape of the hose is maintained by steel coils and should be generally round. If the hose is deformed (normally caused by vehicle traffic), use a rubber or lead hammer to restore the cylinder shape of the hose.

e. *Fittings and Valves.* Check –

- For cracks in the body of the fitting or valve.
- For leakage at the threads
- For broken or bent handles on gate valves.
- To ensure that the nut at the top of the rising stem gate valve is secure.

f. *Gauges and Flowmeters.* In addition to functional checks during normal operations, check for –

- Cracked or broken glass.
- The presence of caps and plugs attached by chain and key rings.
- Presence and condition of gaskets inside the female fittings and caps.

2-8. Repair Procedures.

Part of the Water Distribution and Wastewater Management System (WDWWMS) is the WDWWMS Maintenance Set that includes an assortment of repair parts and critical tools to maintain the system. This set is fielded with the remainder of the system. It is the user's responsibility to replenish the components as needed.

a. *Hose.* The repair procedures discussed here applies to both suction and discharge hoses.

(1) *Broken, torn, or punctured hose.* The principal behind repair services for a damaged hose is to make two good hose sections from one damaged one. Dispose of pieces of hose shorter than 2 feet.

(a) Use a hacksaw to cut the hose and remove the damaged portion.

(b) Place two hose clamps (from the maintenance set) over the newly cut end.

(c) Insert a hose coupling in the newly cut end, as far as it will go. The coupling must be the opposite gender of the cam-lock fitting on the other end of the hose.

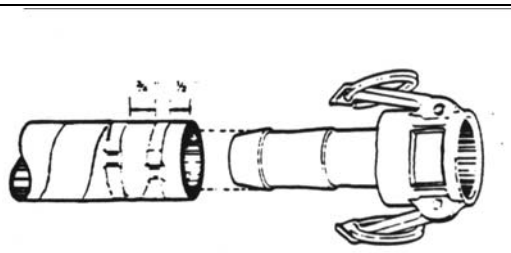

Figure 4-37
Hose Repair

(d) Position the hose clamps near the end of the fitting.

(e) Tighten the hose clamps and trim off the excess.

(f) Attach key rings, chain, and caps (or plugs).

(g) Repeat steps (b) through (f) for the other piece of hose.

b. *Fittings and Valves.* Replace missing or damaged caps, plugs, chains, and rings as needed. The complete fittings and valve assemblies are made up of individual parts that may be requisitioned separately. Should a fitting or valve become unserviceable, retain the serviceable parts for use in reassembling the fitting or valve. This can also be applied to the nozzle, flowmeters and pressure gauge.

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CHAPTER 5

WASTE-WATER AUGMENTATION SET (WWAS)
Medical Force 2000 (MF2K) 296 Bed Configuration

OPERATOR, PMCS, AND REPAIR IINSTRUCTIONS

5-1. Introduction. This augmentation set is designed to allow for the split-based operations of the Hospital Unit Surgical (HUS) and Hospital Unit Base (HUB) of the MF2K Combat Support Hospital.

5-2. Components.

a. *Cam-Lock Connections.* As in the Water Distribution Set (WDS), components of this set use cam-lock fittings. Cam-lock is a quick disconnection system that requires no special training or tools. There are no threads on the parts or hoses to be connected. To use cam-lock fittings, the dust cap or plug is removed from each hose end, then insert the male end fitting into the female end of the other fitting. Pull the levers back towards the hose to cam-lock the two parts together. There are some steps to be followed in making and breaking a hose connection. These steps are discussed elsewhere in this manual. Cam-Lock connections are used for potable water connections within the system.

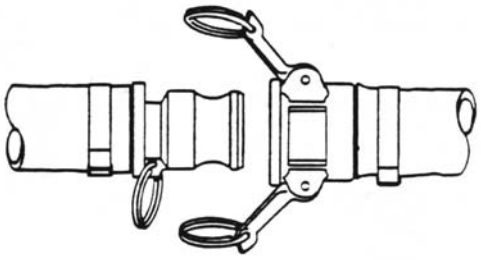

Figure 5-1
Cam-Lock Connection

b. *Coupling Halves.* The Universal Quick Disconnect (or coupling half) is made of galvanized steel and incorporates a rubber gasket to provide a watertight seal when the halves are connected. Universal Quick Disconnect fittings are used for wastewater connections within the system. Two coupling halves will allow the connection of:

(1) two hoses,

(2) a hose and the Pump Assembly, Diaphragm (NSN: 4320-01-440-7388),

(3) a hose and a Valve, Ball (NSN: 4820-01-440-5916)

(4) a hose and a Wye, Quick Disconnect (NSN: 4730-00-496-5952)

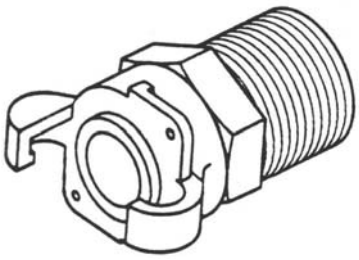

Figure 5-2
Coupling Half
Universal Quick Disconnect

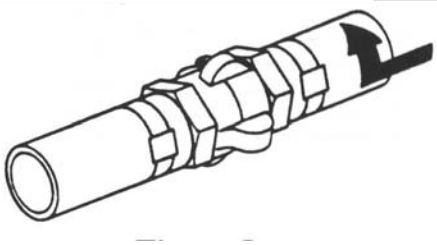

Figure 5-3
Coupling Connection

c. Water Storage Tanks. The Waste-Water Augmentation has the following type and quantity of water storage tanks.

- LIN T19033 – Tank, Fabric Collapsible, 3,000 Gallon Capacity – 2 each (one for water distribution and one for wastewater collection).

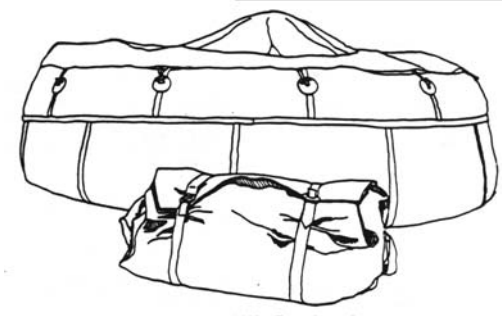

Figure 5-4
Tank Assembly, Fabric, Collapsible
(3,000 Gallon – Onion Type)

d. Water Pumps.

(1) Pump Unit, Centrifugal. The water pump contained within this set and used for potable water distribution is the Pump Unit, Centrifugal, 65 GPM [NSN 4320-01-440-4421 or NSN 4320-01-506-5922]. It has a 220 volt, 3-phase, totally enclosed, fan-cooled, electric motor. Each water pump is supplied with an integral power cord (40') that terminates in a male Class "L" power connector. The plug interfaces directly with the DEPMEDS electrical distribution system. Each pump is outfitted with a male and female, 1 1/2-inch cam-lock connection. There is one pump in the WDS. One pump will serve the primary water distribution loop of the hospital, and the other is used to augment or maintain pressure through the secondary loops. For the MF2K configuration, a third pump is located in the Waste-Water Augmentation Set, Hospital, DEPMEDS (WWAS) (LIN: W49603) (NSN: 6545-01-435-6013). The third pump will be used in the event that a Hospital Unit Base (HUB) and a Hospital Unit Surgical (HUS) operate independently.

CAUTION
Two persons are required to lift or carry a water pump.

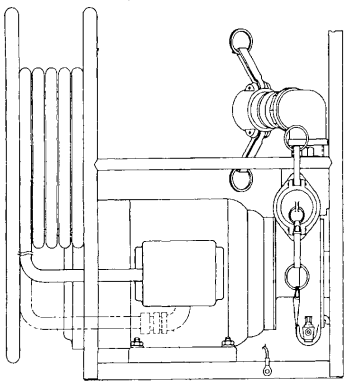

Figure 5-5
Pump Unit, Centrifugal, 65 GPM
(Potable Water)

(2) Pump Unit, Reciprocating. The wastewater pump contained within this set and used for wastewater evacuation is the Pump Unit, Reciprocating, [NSN: 4320-01-440-4421]. The electric motor driven pump is a portable, frame mounted, unit. It is designed to evacuate wastewater at the maximum rate of 2,600 gallons per hour, at 60 strokes per minute. The pump is equipped with a ¾ HP (horsepower), capacitor start, ball bearing motor.

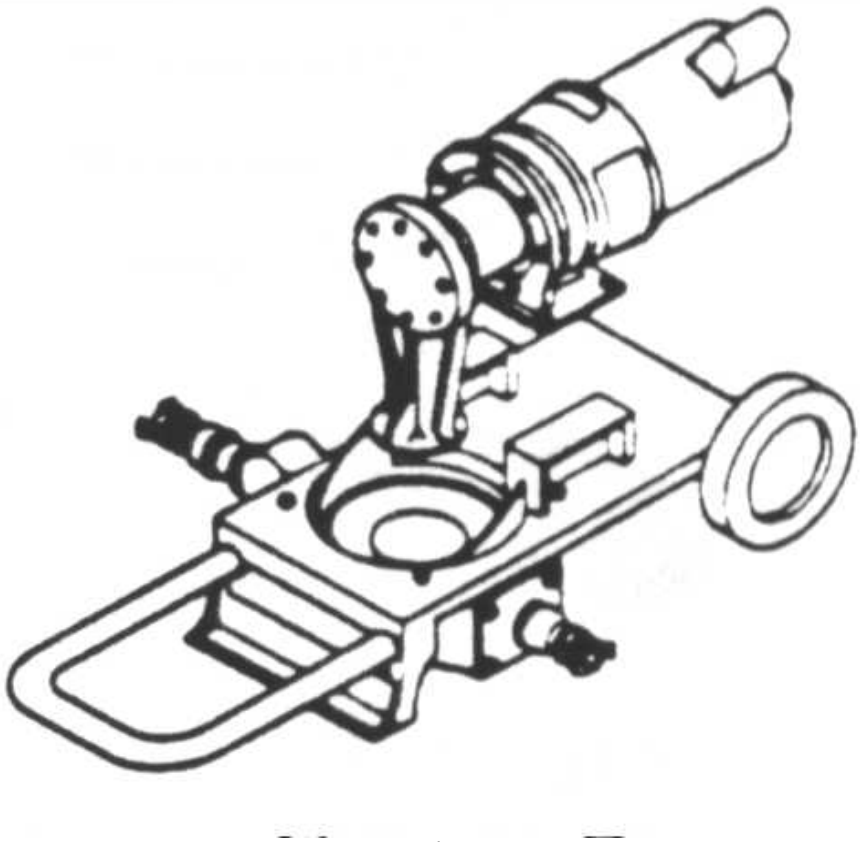

Figure 5-6
Pump Unit, Reciprocating (Wastewater)

e. Hoses. The hoses that are contained within the WWAS are:

(1) Potable water hoses:

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8338)
PN: 13225E9136-14
5-feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-175-5958)
PN: 13229E9136-12
10-feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-177-3714)
PN: 13225E9136-13
20-feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8337)
PN: 13225E9136-15
50-feet in length, 1-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8336)
PN: 13225E9136-17
5-feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(Discharge)
(NSN: 4720-01-438-7779)
PN: 13225E9135-9
10-feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8343)
PN: 13225E9136-9
10-feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-438-8341)
PN: 13225E9136-10
20-feet in length, 1½-inch diameter

Hose Assembly, Nonmetallic
(NSN: 4720-01-140-6228)
PN: 13225E9136-4
20-feet in length, 4-inch diameter

(2) Wastewater hoses:

Hose Assembly, Rubber
(NSN: 4720-01-434-9646)
PN: 13229E7223-1
5-feet in length, 1-inch diameter

Hose Assembly, Rubber
(NSN: 4720-01-434-9594)
PN: 13229E7223-2
10-feet in length, 1-inch diameter

Hose Assembly, Rubber
(Drain hose for field sink)
(NSN: 4720-01-434-9627)
PN: 13229E7226
10-feet in length, 1-inch diameter

Hose Assembly, Rubber
(NSN: 4720-01-434-9605)
PN: 13229E7223-3
20-feet in length, 1-inch diameter

Hose Assembly, Rubber
(NSN: 4720-01-434-9649)
PN: 13229E7223-4
50-feet in length, 1-inch diameter

Hose Assembly, Rubber
(NSN: 4720-01-434-9638)
PN: 13229E5746-4
50-feet in length, 1½ inch diameter

f. Fittings and Valves.

(1) Potable water:

(a) Valve, Check (NSN: 4820-01-440-5919, PN: 13229E7197) This valve is used to keep water in the potable hose line from reversing flow.

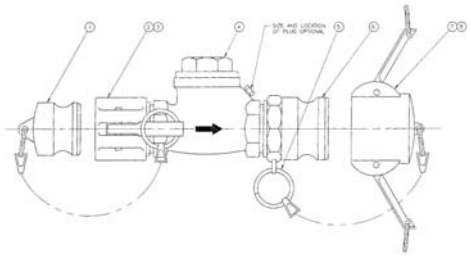

Figure 5-7
Valve, Check

(b) Valve, Gate, 1-inch female, 1-inch male (NSN: 4820-01-440-7798, PN: 13229E7167). When used with individual water users, such as field sinks and nozzles this

valve controls the rate of flow. It is also used at the beginning of secondary loops and long one-way water lines. Used this way, repairs or changes in the secondary loops can be made without interrupting water supply to the rest of the hospital.

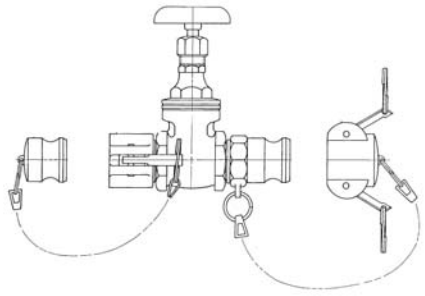

Figure 5-8
Valve, Gate, 1-inch female, 1-inch male

(c) Valve, Gate,1½-inch female, 2-inch male (NSN: 4820-01-440-8302, PN: 13229E7177). This valve is attached to the female cam-lock of the Reducer, 4-inch M to 2-inch F (NSN: 4730-01-186-0821) (PN: AA59326XI-1-10) which will be used on the Tank Assembly, Fabric Collapsible (20,000 gallon) (LIN: T12938, NSN: 5430-01-406-0507).

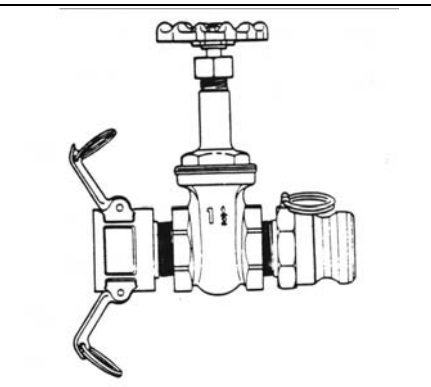

Figure 5-9
Valve, Gate, 1½-inch female, 2-inch male

(d) Valve, Gate, 2-inch female, 1½-inch male (NSN 4820-01-440-8306) (PN: 13229E7178). This valve is attached to the male cam-lock of the Reducer, 4-inch F x 2-inch M (NSN: 4730-01-064-0560, PN: AA59326XI-1-9) which will be used on the Tank Assembly, Fabric Collapsible (20,000 gallon) (LIN: T12938, NSN: 5430-01-406-0507).

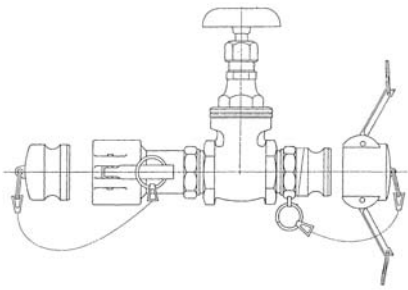

Figure 5-10
Valve, Gate, 2-inch female, 1½-inch male

(e) Valve, Gate, 4-inch female, 4-inch male (NSN: 4820-01-440-8765, PN: 13229E7169).

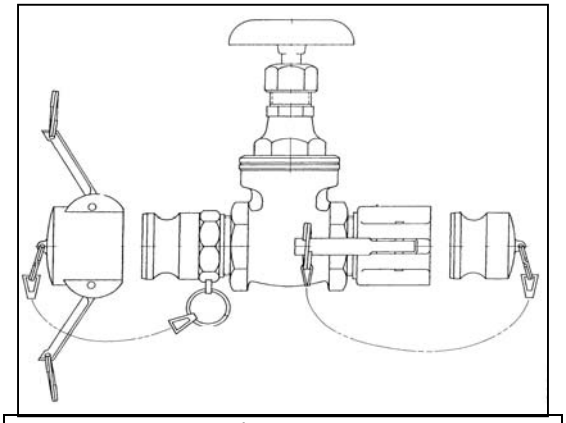

Figure 5-11
Valve, Gate, 4-inch female, 4-inch male

(f) Valve, Globe, 1½-inch female, 1½-inch male (NSN: 4820-01-440-8765, PN: 13229E7169). This valve is attached to the 1½-inch loop, immediately after the beginning of a 1-inch loop. It is also used when multiple water tanks are arranged in parallel. In this application, the valve

is manually adjusted to control the rate of flow in the system.

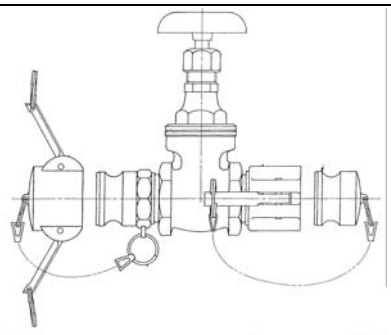

Figure 5-12
Valve, Globe, 1½ inch female, 1½ inch male

(g) Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch male x 1-inch male (NSN: 4730-01-440-4609, PN: 13229E7172). This fitting is used at each place where the one-way feeder lines branch off to the individual users, such as CMS, pharmacy, X-Ray, laboratory, etc. It is also used at the beginning and end of the secondary loop.

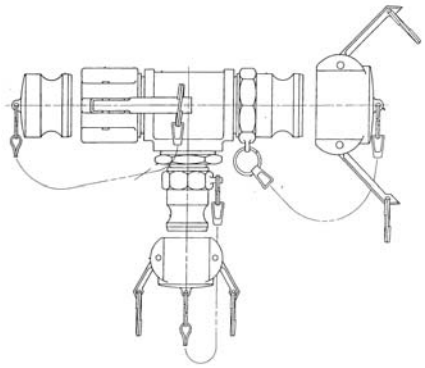

Figure 5-13
Tee Assembly, Quick Disconnect, 1½-inch female x 1½-inch male x 1-inch male

(h) Tee Assembly, Quick Disconnect, 1½-inch male, 1½-inch male, 1½-inch female (NSN: 4730-01-440-4633, PN: 13229E7182). This fitting is used on the return side of the primary loop.

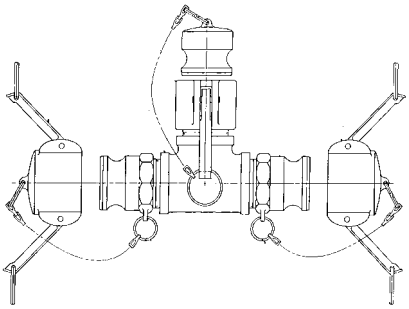

Figure 5-14
Tee Assembly, Quick Disconnect, 1½-inch male, 1½-inch male, 1½-inch female

(i) Tee Assembly, Quick Disconnect, 1½-inch female, 1½-inch female, 1½-inch male (NSN: 4730-01-440-4615, PN: 13229E7181). This fitting is located between the Tank Assembly, Fabric Collapsible (5,000 Gallon) and the Pump Unit, Centrifugal, 65 GPM [NSN 4320-01-440-4421] when two or more Tank Assembly, Fabric Collapsible (5,000 Gallon) are employed in parallel.

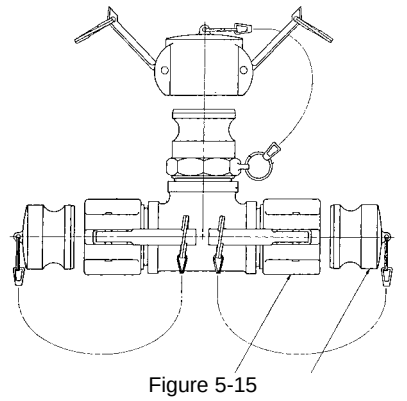

Figure 5-15
Tee Assembly, Quick Disconnect, 1½-inch female, 1½-inch female, 1½-inch male

(j) Tee Assembly, Quick Disconnect, 1½-inch female, 1½-inch male x ¼-inch male (NSN: 4730-01-487-3575) is used to connect the Hypochlorination Unit (NSN: 4610-01-435-4884) (PN: WAL-1031-96) to the primary loop.

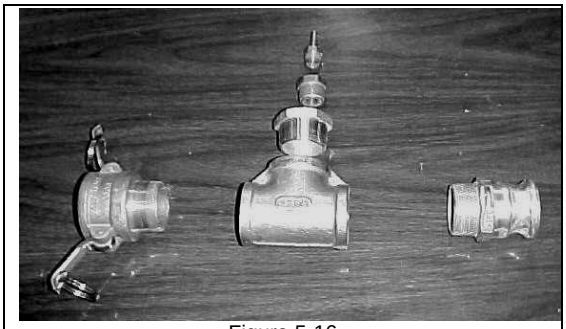

Figure 5-16
Tee Assembly, Quick Disconnect, 1½-inch female, 1½-inch male x ¼-inch male

(k) Coupling Assembly, Quick Disconnect, 1-inch female x 1-inch female (NSN: 4730-01-440-8569, PN: 13229E7173). This coupling assembly is commonly referred to as a “Gender Changer”. It is used when a male outlet is connected to a second male connection and as a connection on the Hamilton Sink connections for the ISO containers.

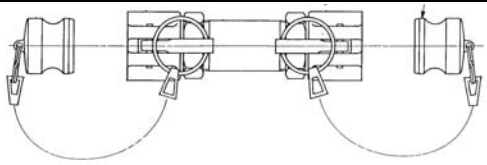

Figure 5-17
Coupling Assembly, Quick Disconnect, 1-inch female x 1-inch female

(l) Plug, Quick Disconnect (NSN: 4730-01-415-6403, PN: 13229E7170). This fitting is used in conjunction with Adapter, Straight Hose to Boss (NSN: 4730-01-415-6420, PN: 13229E7195) to connect field sinks to the water loop.

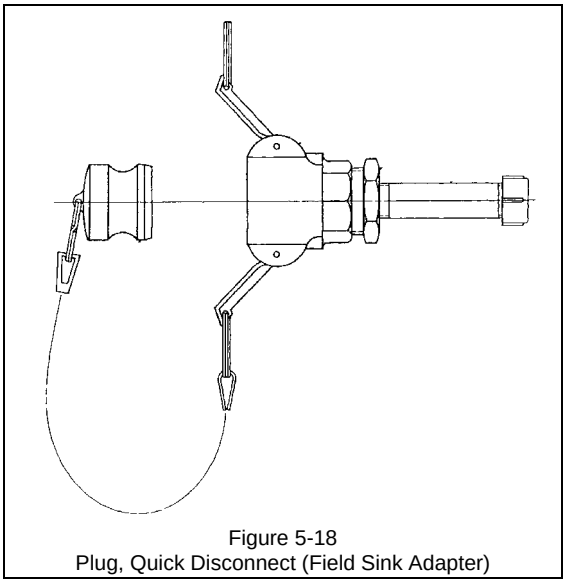

Figure 5-18
Plug, Quick Disconnect (Field Sink Adapter)

(m)Adapter, Straight Hose to Boss (NSN: 4730-01-415-6420, PN: 13229E7195). This fitting is used in conjunction with Plug, Quick Disconnect (NSN: 4730-01-415-6403, PN: 13229E7170) to connect field sinks to the water loop. This is the first example where both connections are not cam-lock.

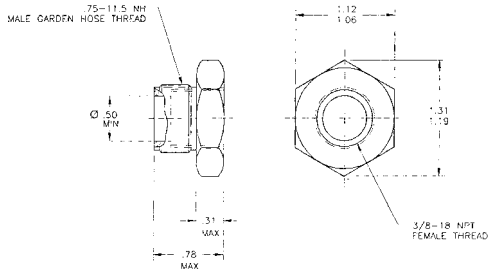

Figure 5-19
Adapter, Straight Hose to Boss

(3) Wastewater:

(a) *Adapter, Sink.* (NSN: 6545-01-434-9630, PN: 13229E7224) The sink adapter consists of a pipe to hose adapter, a reducing pipe coupling, and a universal quick disconnect coupling half.

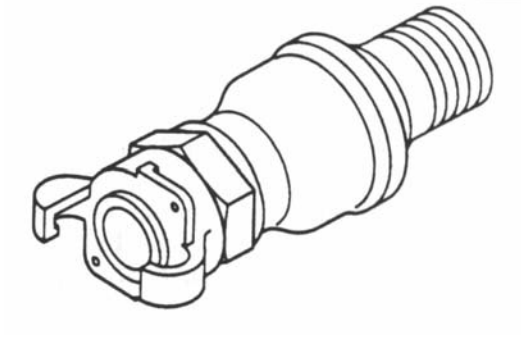

Figure 5-20
Adapter, Sink (for Hamilton Sink)

(b) Wye, Quick Disconnect (NSN: 4730-00-496-5952, PN: WW-C-633-M)

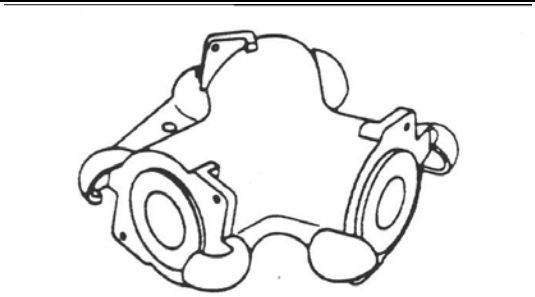

Figure 5-21
Wye, Quick Disconnect

(c) *Valve, Ball.* (NSN: 4820-01-440-5916, PN: 13225E7225) The ball valve provides a means to close off the WWMS. It is used near the funnel and stand assemblies.

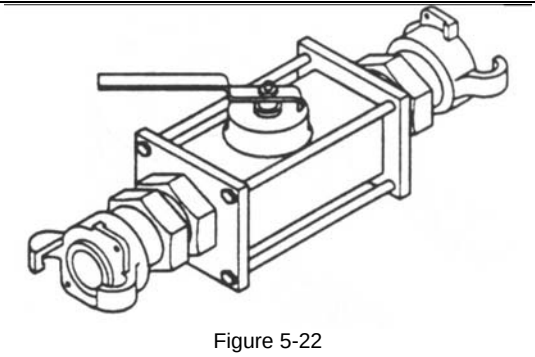

Figure 5-22
Valve, Ball

g. *Other Components:*

(1) Potable Water:

(a) Pipe Assembly, Potable Water (NSN: 4610-01-440-4086, PN: 13229E7162). This component measures the water pressure in the distribution system. This gauge is generally placed at the return end of the main loop. Its precise location depends on how the tanks are employed. **THE PRESSURE GAUGE IS FRAGILE.** When not in use, store it in the Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

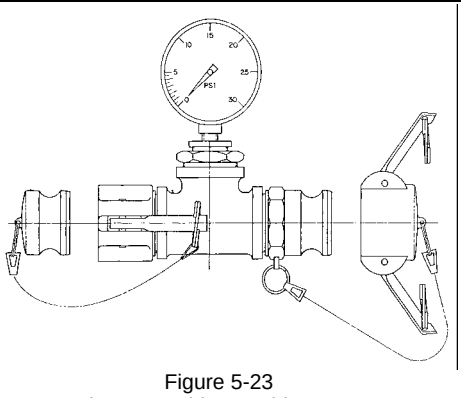

Figure 5-23
Pipe Assembly, Potable Water
(Pressure Gauge)

(b) Pipe Assembly, Potable Water (NSN: 4610-01-440-4088, PN: 13229E7165). The water distribution system uses a flow meter that measures flow rates up to 100 GPM. It is placed at the end of the primary loop, immediately before the pressure gauge. **FLOW METERS ARE FRAGILE.** When not in use, store them in the Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

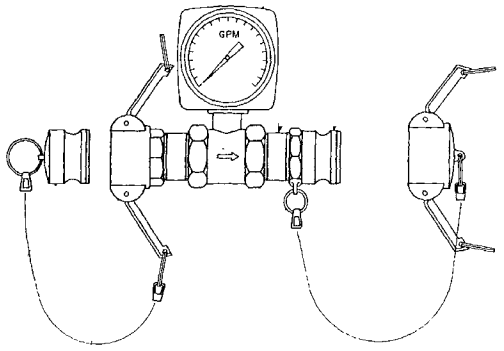

Figure 5-24
Pipe Assembly, Potable Water
(Flowmeter)

(c) Indicator Assembly (NSN: 4610-01-440-4090, PN: 13229E7163). This assembly is used to monitor water flow through the distribution system. **THIS ASSEMBLY IS FRAGILE.** When not in use, store it in the Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189).

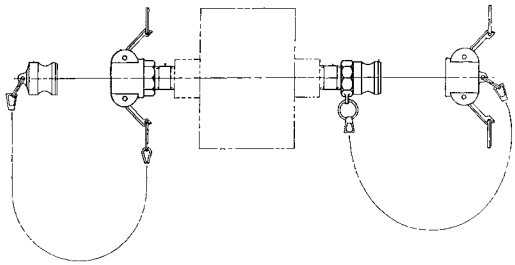

Figure 5-25
Indicator Assembly

(d) Case Electrical-Electronic Test (NSN: 6625-01-449-2857, PN: 13229E7189). This case is used to store the pressure gauges, flow meters, indicator assembly and color comparator.

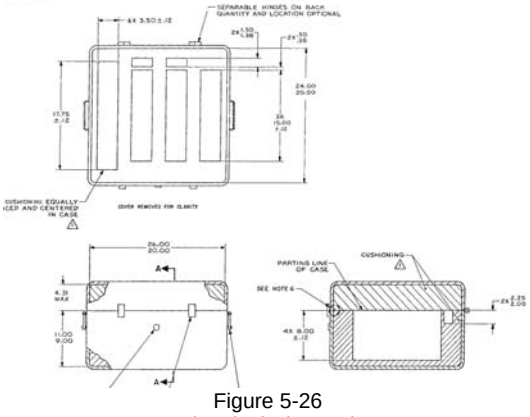

Figure 5-26
Case Electrical-Electronic Test

(e) Comparator, Color (NSN: 6630-01-044-0334, PN: U25377). The equipment operator to visually determine the turbidity of the supplied water uses the comparator.

(f) Stand Assembly, Distribution Nozzle (NSN: 4930-01-120-7426, PN: 13225E9140). This assembly is used to suspend the Nozzle Assembly, Water (NSN: 4610-01-440-8834, PN: 13229E7168).

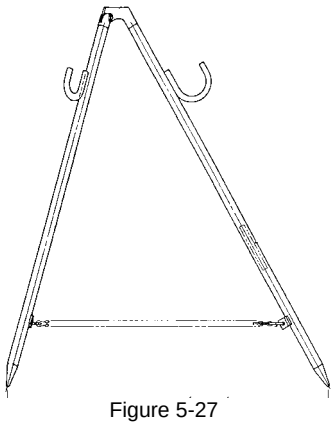

Figure 5-27
Stand Assembly, Distribution Nozzle

(g) Nozzle Assembly, Water (NSN: 4610-01-440-6834, PN: 13229E7168). The nozzle is provided to supply water to those parts of the hospital that are not connected to the water distribution

system. Other uses for this nozzle are outlined in the principles of installation section of this chapter.

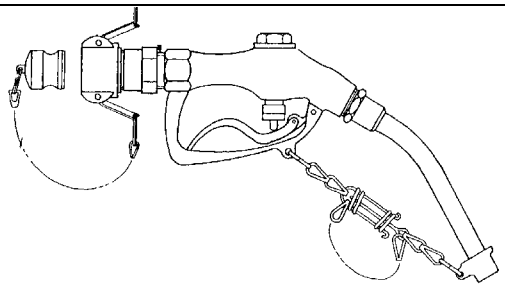

Figure 5-28
Nozzle Assembly, Water

(h) Strainer, Sediment (NSN: 4730-01-440-7662, PN: 13229E7179). This fitting is used to strain or remove large particles that could damage the water pumps in the water distribution system.

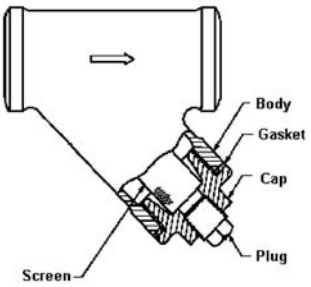

Figure 5-29
Strainer, Sediment

(i) Storage Devices. The Water Distribution Set, MF2K comes with two possible configurations of storage devices.

(a) The older configurations of the WDS comes with:

(1) Storage and Retrieval Materiel System (NSN: 3990-01-449-1997, PN: 13229E7185). This cage-like component is used to store set fittings. The rack is divided into four compartments. This assembly is moved in the same manner as the Reel Assembly. When full, this can weigh as much as 250 pounds. This item is replaced by the Skip, Box, Materiel Handling (NSN: 3990-01-505-5922) in the newer configurations.

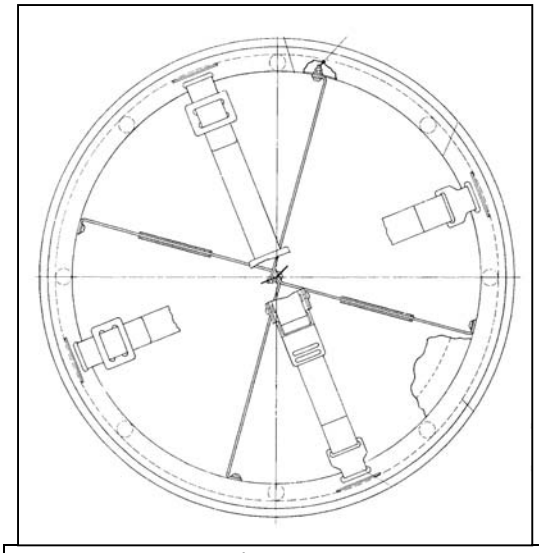

Figure 5-30
Storage and Retrieval Materiel System

CAUTION

When full, this storage and retrieval system can weigh up to 250 pounds and require at least five soldiers to lift it.

NOTE

One method of safely moving this item is to ensure that the cover is securely fastened, setting the item on its side, and rolling it.

(2) Reel Assembly, Hose (NSN: 4940-01-449-3840, PN: 13229E7186-1). This reel assembly is designed for the storage of hoses

in the WDS. Store ONLY potable water hoses (tan colored) in these reels. This item is replaced by the Skip, Box, Materiel Handling (NSN: 3990-01-505-5922) in the newer configurations.

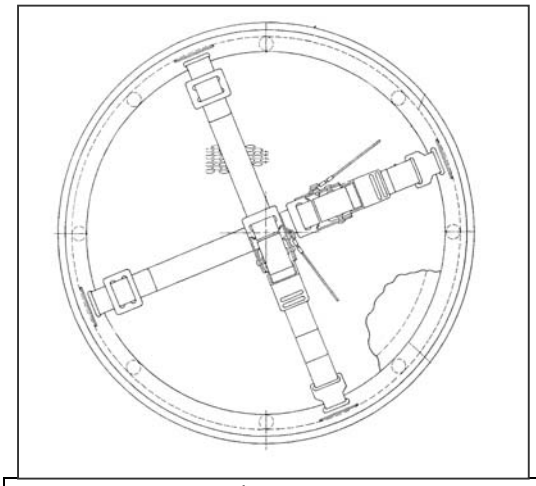

Figure 5-31
Reel Assembly, Hose

CAUTION

When full, this storage and retrieval system can weigh up to 250 pounds and require at least five soldiers to lift it.

NOTE

One method of safely moving this item is to ensure that the cover is securely fastened, setting the item on its side, and rolling it.

(b) The newer configurations of this set come with Skip Box, Materiel Handling (NSN: 3990-01-505-5922). This container is used for the storage of hoses and fittings used in the distribution set.

Figure 5-32
Skip Box, Materiel Handling

(j) Can, Water, Military (NSN: 7240-00-089-3827, PN: MIL-C-43613). This is used for mixing the Sodium, Hypochlorite Technical (NSN: 6810-01-358-4336, PN: 13229E0923) and water for use in the Hypochlorination Unit (NSN: 4610-01-435-484, PN: WAL-1031-96).

(l) Pump Unit, Centrifugal (NSN: 4320-01-440-4421, PN: 13229E7159). The water pumps are supplied with the water distribution set. The water pumps are outfitted with quick-disconnect (cam-lock) fittings, and are rated at producing a 65 GPM water flow.

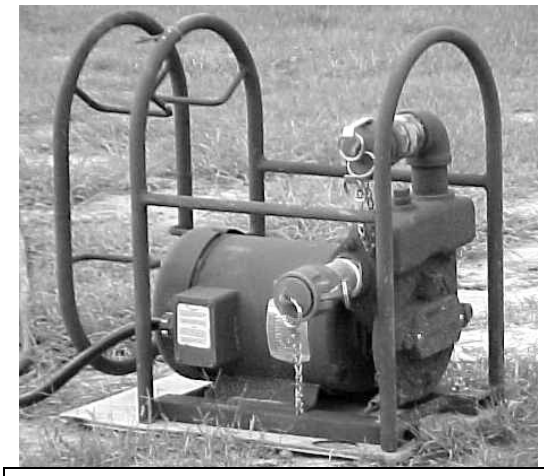

Figure 5-33
Pump Unit, Centrifugal, 65GPM

(m) Hypochlorination Unit (NSN: 4610-01-435-4884, PN: WAL 1031-96). This item is designed to treat and chlorinate the water within the water distribution system. The addition of chlorine based material to the water supply helps retard bacterial and fungal growth within the hoses. It is also designed to provide the capability to flush (hyper-chlorinate) the water lines.

Figure 5-34
Hypochlorination Unit

(2) Wastewater: Pipe, Culvert, Metallic (NSN: 4710-00-057-7252, PN: MIL-P-236)

(3) Multi-use:

(a) Channel, Hose Protector (subsurface) (NSN: 4720-01-440-4928, PN: 13229E7175). This item is used to protect hoses.

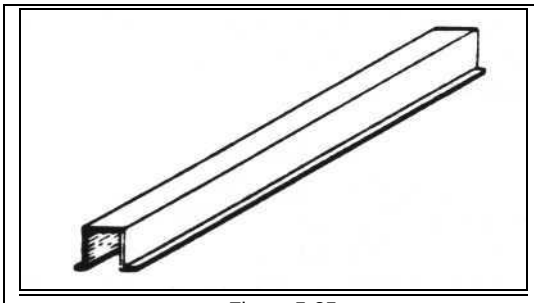

Figure 5-35
Channel, Hose Protector (Subsurface)

(b) Channel, Hose Protector (surface) (NSN: 4720-01-440-4925, PN: 13229E7176). This item is used to protect hoses.

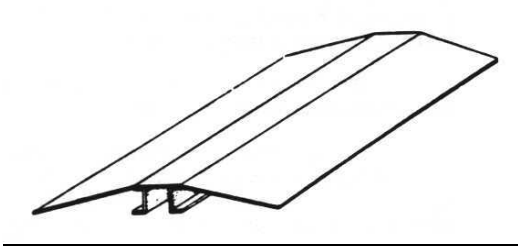

Figure 5-36
Channel, Hose Protector (Surface)

CHAPTER 6

WASTEWATER MANAGEMENT SETS (WWMS)

INTRODUCTION

6-1. Introduction

a. This chapter describes the basic components of the Wastewater Management Sets (WWMS). The combination of hoses, fittings, gauges and valves provides maximum flexibility in setting up the sets. This flexibility will enable you to set up the sets in almost any configuration that will accommodate the hospital's mission.

b. The Wastewater Management Sets come in three configurations depending on the type of Combat Support Hospital to which it is authorized.

- Wastewater Management Set, Hospital, DEPMEDS (MF2K)
- Wastewater Management Set, MRI, 84 Bed (CORPS)
- Wastewater Management Set, MRI, 164 Bed (CORPS)

The components of these three configurations are identical, the only difference is the number of components authorized.

c. The Wastewater Management Set, Hospital, DEPMEDS (MF2K – 296 Bed) comes in two basic versions.

- Wastewater Management Set, Hospital, DEPMEDS (MF2K – 296 Bed) – 2000. This is the version of the set which comes with the Storage and Retrieval Materiel System (NSN: 3990-01-449-1997) for the storage of fittings; and the Reel Assembly, Hose (NSN: 3990-01-449-3840) for the storage of hoses.

- Wastewater Management Set, Hospital, DEPMEDS (MF2K – 296 Bed) – 2002. This version of the set comes with the Skip Box, Materiel Handling (NSN: 3990-01-505-5922) which replaces the Storage and Retrieval Materiel System and the Reel Assembly, Hose.

d. The reason for having a WWMS is to collect and later dispose of hospital wastewater in a safe manner. In addition, it aids in the control of infectious and communicable diseases.

d. In the practice of safe hygiene, it is essential to maintain complete separation of the Water Distribution Set and the WWMS.

6-2. Components

a. *Coupling Halves.* The Universal Quick Disconnect (or coupling half) is made of galvanized steel and incorporates a rubber gasket to provide a watertight seal when the halves are connected. Two coupling halves will allow the connection of:

(1) two hoses,

(2) a hose and the Pump Assembly, Diaphragm (NSN: 4320-01-440-7388),

(3) a hose and a Valve, Ball (NSN: 4820-01-440-5916)

(4) a hose and a Wye, Quick Disconnect (NSN: 4730-00-496-5952)

With two exceptions, all connections in the WWMS use universal quick disconnect. The two exceptions are

- Sink Drain Adapter
- Hose Assembly, Rubber used with the Field Sinks and the Ultrasonic Cleaners.

b. *Water Storage Tanks.* Units are authorized the following types and quantities of water storage tanks. The tanks are designed for the holding of wastewater until it can be evacuated from the site.

Types

- LIN T12938 – Tank Fabric, Collapsible, 20,000 Gallon Capacity
- LIN TBD, Tank Fabric, Collapsible, 5,000 Gallon Capacity
- LIN T19033 – Tank, Fabric, Collapsible, 3,000 Gallon Capacity

Requirements

	T12938	TBD	T19033
	20K Gal	5K Gal	3K Gal
MF2K	1	0	1
MRI 84	0	1	0
MRI 164	1	0	0

b. *Hose Assembly*. All hoses in the WWMS are black in color. These hoses are not used for any purpose other than wastewater evacuation. Each hose assembly has a universal quick disconnect at each end. Do not use black hose to replace or repair any potable water (sand color) hose. Hoses in the set are:

Hose Assembly, Rubber
NSN: 4730-01-434-9638
PN: 13230E5746-4
(1½-inch x 50-feet)

Hose Assembly, Rubber
NSN: 4730-01-434-9594
PN: 13229E7223-2
(1-inch x 10-feet)

Hose Assembly, Rubber
NSN: 4730-01-434-9605
PN: 13229E7223-3
(1-inch x 20-feet)

Hose Assembly, Rubber
NSN: 6545-01-434-9646
PN: 13229E7223-1
(1-inch x 5-feet)

Hose Assembly, Rubber
NSN: 6545-01-434-9649
PN: 13229E7223-4
(1-inch x 50-feet)

c. Adapter, Sink. (NSN: 6545-01-434-9630, PN: 13229E7224) The sink adapter consists of a pipe to hose adapter, a reducing pipe coupling, and a universal quick disconnect coupling half.

e. *Hose Assembly, Rubber (Field Sink Drain Hose Assembly)*. (NSN: 6545-01-434-9627, PN: 13229E7226) This assembly consists of a section of black hose with a hose coupling assembly on one end and a universal quick disconnect coupling half on the other end. This assembly replaces the existing drain hose on field sinks. The hose assembly is also used to drain the ultrasonic cleaner.

e. Stand Assembly, Distribution Nozzle. (NSN: 4930-01-120-7426, PN: 13225E9140) The Stand Assembly is a collapsible steel tripod. It has chains attached to the legs to prevent them from opening too far. Each leg has a hook at the top to hang the Funnel Assembly.

g. *Funnel Assembly.* (NSN: 6545-01-434-9587, PN: 13229E7229) The Funnel Assembly consists of a large black funnel with a screen fitted inside, a universal quick disconnect coupling half secured to a discharge tube, and three hooks for hanging the funnel from the Stand Assembly, Distribution Nozzle.

WARNING

The Water Distribution Nozzle and the Waste Funnel Assembly should not be suspended from the same Stand Assembly. This could result in contamination of the water system. Use one Stand Assembly for the nozzle and one Stand Assembly for the Funnel Assembly.

h. *Valve, Ball.* (NSN: 4820-01-440-5916, PN: 13225E7225) This valve provides a means to close off the WWMS. It is used near the funnel and stand assemblies.

i. *Storage Devices*. The Wastewater Management Set, MF2K comes with two possible configurations of storage devices.

(1) The older configurations of the WWMS comes with:

(a) Storage and Retrieval Materiel System (NSN: 3990-01-449-1997, PN: 13229E7185). This reel-like component is used to store set fittings. The rack is divided into four compartments. This assembly is moved in the same manner as the Reel Assembly. When full, this can weigh as much as 250 pounds. This item is replaced by the Skip Box, Materiel Handling (NSN: 3990-01-505-5922) in the newer configurations.

(b) Reel Assembly, Hose (NSN: 4940-01-449-3840, PN: 13229E7186-1). This reel assembly is designed for the storage of hoses in the WWMS. Store **ONLY** wastewater hoses (black colored) in these reels. This item is replaced by the Skip Box, Materiel Handling (NSN: 3990-01-505-5922) in the newer configurations.

(2) The newer configurations of this set come with Skip Box, Materiel Handling (NSN: 3990-01-505-5922). This cage is used for the storage of both hoses and fittings used in the wastewater management set.

6-3. Principles of Installation.

The information in this chapter provides guidance to help plan the physical layout for the hospital. Obtain a scale drawing or diagram of the deployed hospital and sketch the layout of the Water Distribution Set and the WWMS on this diagram. Depending on the size and configuration of the hospital, plan on at least one primary loop, and if weather conditions warrant, the use of one or more secondary loop(s).

a. *Location of Wastewater Collection Site.* The collection site is the most important factors in setting up the WWMS. The terrain as well as the plans of the Unit Commander will dictate placement and the type of collection site(s).

- The collection site must be at least 300 feet (100 yards) from the hospital boundary.
- It must not be located on higher terrain that the freshwater tank(s). Position the collection site in an area lower than the rest of the hospital and away from the fresh water tank(s). This will aid the pump in drawing the wastewater and, if a leak occurs, prevent the wastewater from contaminating the other areas of the hospital complex.
- Sufficient space needs to be allocated to ensure waste water does not overflow into areas where its presence would be undesirable.
- Allow space for wastewater evacuation vehicles access to the waste water tank(s).

CAUTION

The Wastewater Collection Site MUST be at least 300 feet (100 yards) from the hospital boundary, and should never be on a higher terrain level than the freshwater tank(s).

b. *Location of Pumps.* Locate pumps on each loop, close to the collection site. Note that the power cable on the pump is 40-feet long. **DO NOT USE AN EXTENSION CORD.** Elevate electrical connections (plugs, etc.) on wooden blocks above areas where puddles may form. The pump provided [Pump Assembly, Diaphragm, NSN: 4320-01-440-7388, PN: 13229E7222] is driven by a single-phase 115 volt, 60 Hertz electric motor. The motor should be supplied by a dedicated branch circuit protected by a fuse or circuit breaker rated at no more than 15 amps.

c. *Location of Sinks and Water Distribution Connections.* The WWMS collects waste water from sinks and drain funnels. The location of Water Distribution Set components will determine the layout of the WWMS hoses and receptacles. They should be located to preclude cross-contamination of the potable water.

d. *Location of Hose Protection Channels.* Hoses should not cross vehicle routes. Hoses crossing pedestrian paths should be kept to a minimum. If a hose must cross a TEMPER, do so at a passageway, and use a hose protection channel. Where possible, allow waste and fresh water hoses to share a hose protection channel.

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CHAPTER 7

WASTEWATER MANAGEMENT SET (WWMS)
Medical Force 2000 (MF2K) 296-Bed Configuration

OPERATOR INSTRUCTIONS, PMCS, AND REPAIR INSTRUCTIONS

7-1. Introduction

a. This set is a subsystem of the Water Distribution and Wastewater Management System (WDWWMS), DEPMEDS, MF2K. For brevity in this chapter, the wastewater management set will be identified as a WWMS.

b. This chapter describes the assembly, operation and disassembly of the WWMS. This set allows for the evacuation of wastewater generated by hospitals up to 296 beds.

c. The reason for having a WWMS is to collect and later dispose of hospital wastewater in a safe manner. In addition, it aids in the control of infectious and communicable diseases.

d. In the practice of safe hygiene, it is essential to maintain complete separation of the Water Distribution Set and the WWMS.

7-2. Components

a. *Coupling Halves.* The Universal Quick Disconnect (or coupling half) is made of galvanized steel and incorporates a rubber gasket to provide a watertight seal when the halves are connected. Two coupling halves will allow the connection of:

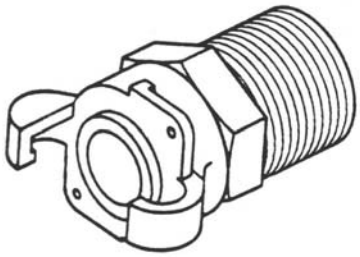

Figure 7-1
Coupling Half
Universal Quick Disconnect

(1) two hoses,

(2) a hose and the Pump Assembly, Diaphragm (NSN: 4320-01-440-7388),

(3) a hose and a Valve, Ball (NSN: 4820-01-440-5916)

(4) a hose and a Wye, Quick Disconnect (NSN: 4730-00-496-5952)

With two exceptions, all connections in the WWMS use universal quick disconnect. The two exceptions are

- Sink Drain Adapter
- Hose Assembly, Rubber used with the Field Sinks and the Ultrasonic Cleaners.

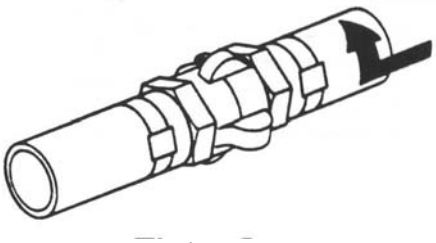

Figure 7-2
Coupling Connection

b. *Water Storage Tanks.* Units are authorized the following types and quantities of water storage tanks.

Types

- LIN T12938 – Tank Fabric, Collapsible, 20,000 Gallon Capacity

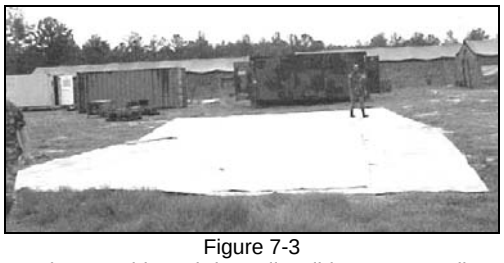

Figure 7-3
Tank Assembly, Fabric, Collapsible, 20,000 Gallon
Laid Out on Ground

- LIN T19033 – Tank, Fabric, Collapsible, 3,000 Gallon Capacity. This tank is packed in the Waste-Water Augmentation Set, Hospital, DEPMEDS (WWAS) (LIN: W49603) (NSN: 6545-01-435-6013) and is designed for use with the Medical Force 2000 (MF2K) configured Combat Support Hospital (CSH) 296 Bed for use in split-based operations.

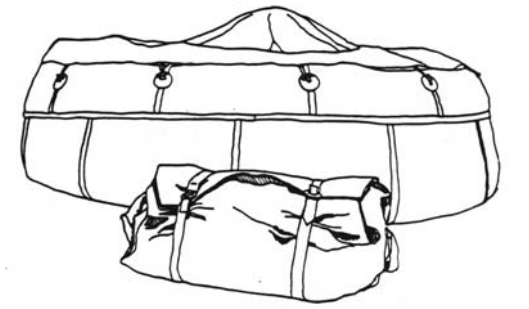

Figure 7-4
Tank Assembly, Fabric, Collapsible, 3,000 Gallon
(Onion Type)

Requirements

LIN	T12938	T19033
NSN	5430-01-241-7524	5430-01-170-6984
Size	20K Gal	3K Gal
MF2K	1	1

b. *Hose Assembly*. All hoses in the WWMS are black in color. These hoses are not used for any purpose other than wastewater evacuation. Each hose assembly has a universal quick disconnect at each end. Do not use black hose to replace or repair any potable water (sand color) hose. Hoses in the set are:

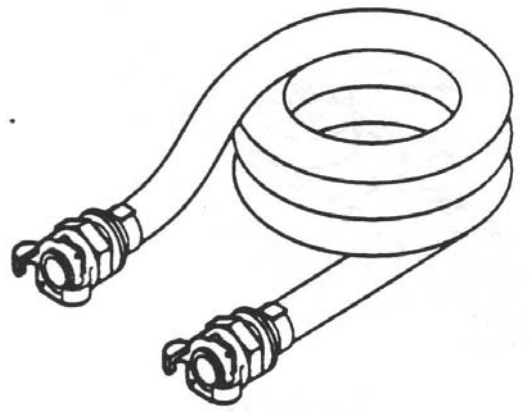

Figure 7-5
Hose Assembly, Nonmetallic

Hose Assembly, Rubber
NSN: 4730-01-434-9638
PN: 13230E5746-4
(1½-inch x 50-feet)

Hose Assembly, Rubber
NSN: 4730-01-434-9594
PN: 13229E7223-2
(1-inch x 10-feet)

Hose Assembly, Rubber
NSN: 4730-01-434-9605
PN: 13229E7223-3
(1-inch x 20-feet)

Hose Assembly, Rubber
NSN: 6545-01-434-9646
PN: 13229E7223-1
(1-inch x 5-feet)

Hose Assembly, Rubber
NSN: 6545-01-434-9649
PN: 13229E7223-4
(1-inch x 50-feet)

d. *Adapter, Sink.* (NSN: 6545 -01-434-9630, PN: 13229E7224) The sink adapter consists of a pipe to hose adapter, a reducing pipe coupling, and a universal quick disconnect coupling half.

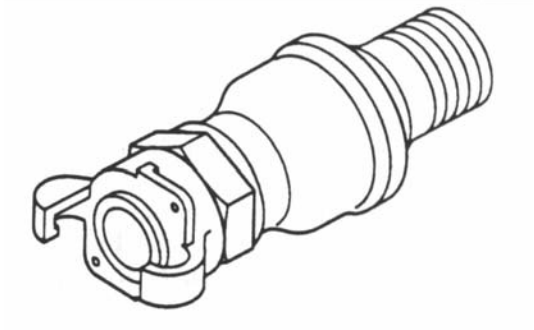

Figure 7-6
Adapter, Sink (for Hamilton Sink)

e. *Hose Assembly, Rubber (Field Sink Drain Hose Assembly)*. (NSN: 6545-01-434-9627, PN: 13229E7226) This assembly consists of a section of black hose with a hose coupling assembly on one end and a universal quick disconnect coupling half on the other end. This assembly replaces the existing drain hose on field sinks. The hose assembly is also used to drain the ultrasonic cleaner.

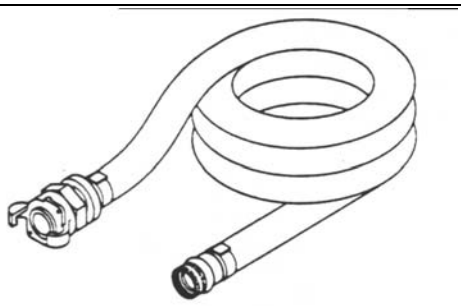

Figure 7-7
Hose Assembly, Rubber
(Field Sink Drain Hose Assembly)

f. *Stand Assembly, Distribution Nozzle.* (NSN: 4930-01-120-7426, PN: 13225E9140) The Stand Assembly is a collapsible steel tripod. It has chains attached to the legs to prevent them from opening too far. Each leg has a hook at the top to hang the Funnel Assembly.

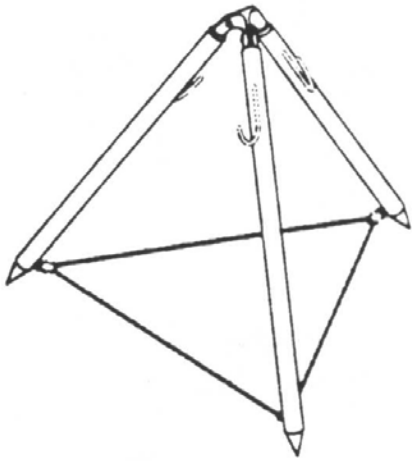

Figure 7-8
Stand Assembly, Distribution Nozzle

g. *Funnel Assembly.* (NSN: 6545-01-434-9587, PN: 13229E7229) The Funnel Assembly consists of a large black funnel with a screen fitted inside, a universal quick disconnect coupling half secured to a discharge tube, and three hooks for hanging the funnel from the Stand Assembly, Distribution Nozzle.

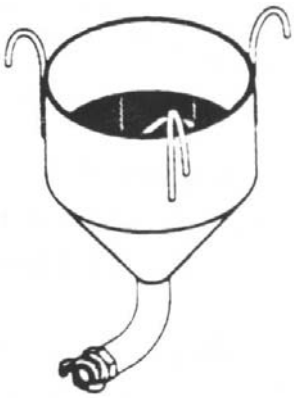

Figure 7-9
Funnel Assembly

WARNING

The Water Distribution Nozzle and the Waste Funnel Assembly should not be suspended from the same Stand Assembly. This could result in contamination of the water system. Use one Stand Assembly for the nozzle and one Stand Assembly for the Funnel Assembly.

h. *Valve, Ball.* (NSN: 4820-01-440-5916, PN: 13225E7225) The ball valve provides a means to close off the WWMS. It is used near the funnel and stand assemblies.

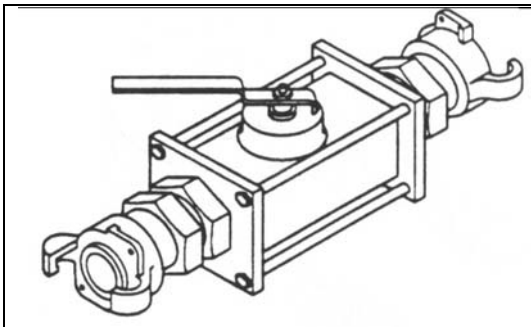

Figure 7-10
Valve, Ball

i. Storage Devices. The Water Distribution Set, MF2K comes with two possible configurations of storage devices.

(1) The older configurations of the WDS comes with:

(a) Storage and Retrieval Materiel System (NSN: 3990-01-449-1997, PN: 13229E7185). This reel-like component is used to store set fittings. The rack is divided into four

compartments. This assembly is moved in the same manner as the Reel Assembly. When full, this can weigh as much as 250 pounds. This item is replaced by the Cage, Wire, Folding (NSN: 3990-01-505-5922) in the newer configurations.

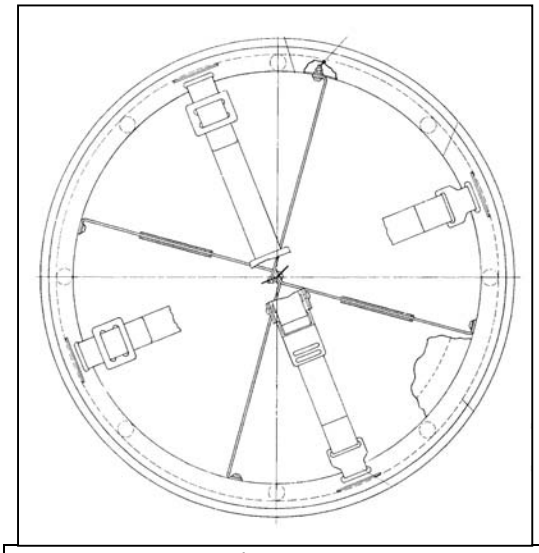

Figure 7-11
Storage and Retrieval Materiel System

CAUTION

When full, this storage and retrieval system can weigh up to 250 pounds and require at least five soldiers to lift it.

NOTE

One method of safely moving this item is to ensure that the cover is securely fastened, setting the item on its side, and rolling it.

(b) Reel Assembly, Hose (NSN: 4940-01-449-3840, PN: 13229E7186-1). This reel assembly is designed for the storage of hoses in the WWMS. Store **ONLY** wastewater water hoses (black colored) in these reels. This item is replaced by the Skip Box, Material Handling (NSN: 3990-01-505-5922) in the newer configurations.

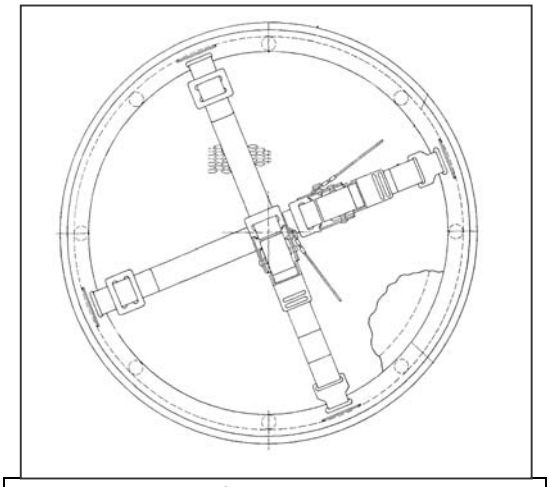

Figure 7-12
Reel Assembly, Hose

CAUTION

When full, this storage and retrieval system can weigh up to 250 pounds and require at least five soldiers to lift it.

(c) *Skip Box, Material Handling.* The cage-like device is designed for the storage of hoses and fittings.

Figure 7-13
Skip Box, Material Handling

7-3. Principles of Installation.

The information in this chapter provides guidance to help plan the physical layout for the hospital. Obtain a scale drawing or diagram of the deployed hospital and sketch the layout of the Water Distribution Set and the WWMS on this diagram. Depending on the size and configuration of the hospital, plan on at least one primary loop, and if weather conditions warrant, the use of one or more secondary loops.

a. *Location of Wastewater Collection Site.* The collection site is the most important factors in setting up the WWMS. The terrain as well as the plans of the Unit Commander will dictate placement and the type of collection site(s).

- The collection site must be at least 300 feet (100 yards) from the hospital boundary.

- It should must not be located on higher terrain that the freshwater tank(s). Position the collection site in an area lower than the rest of the hospital and away from the fresh water tank(s). This will aid the pump in drawing the wastewater and, if a leak occurs, prevent the wastewater from contaminating the other areas of the hospital complex.

- Sufficient space needs to be allocated to ensure waste water does not overflow into areas where its presence would be undesirable.

- Allow space for wastewater evacuation vehicles access to the waste water tank(s).

WARNING

The Wastewater Collection Site MUST be at least 300 feet (100 yards) from the hospital boundary, and should never be on a higher terrain level than the freshwater tank(s).

b. *Location of Pumps.* Locate pumps on each loop, close to the collection site. Note that the power cable on the pump is 40 feet long. **DO NOT USE AN EXTENSION CORD.** Elevate electrical connections (plugs, etc.) on wooden blocks above areas where puddles may form. The pump provided [Pump Assembly, Diaphragm, NSN: 4320-01-440-7388, PN: 13229E7222] is driven by a single-phase 115 volt, 60 Hertz electric motor. The motor should be supplied by a dedicated branch circuit protected by a fuse or circuit breaker rated at no more than 15 amps.

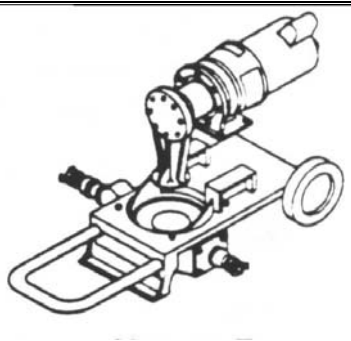

Figure 7-14
Pump Unit, Reciprocating

c. *Location of Sinks and Water Distribution Connections.* The WWMS collects waste water from sinks and drain funnels. The location of Water Distribution Set components will determine the layout of the WWMS hoses and receptacles. They should be located to preclude cross-contamination of the potable water.

d. *Location of Hose Protection Channels.* Hoses should not cross vehicle routes. Hoses crossing pedestrian paths should be kept to a minimum. If a hose must cross a TEMPER, do so at a passageway, and use a hose protection channel. Where possible, allow waste and fresh water hoses to share a hose protection channel.

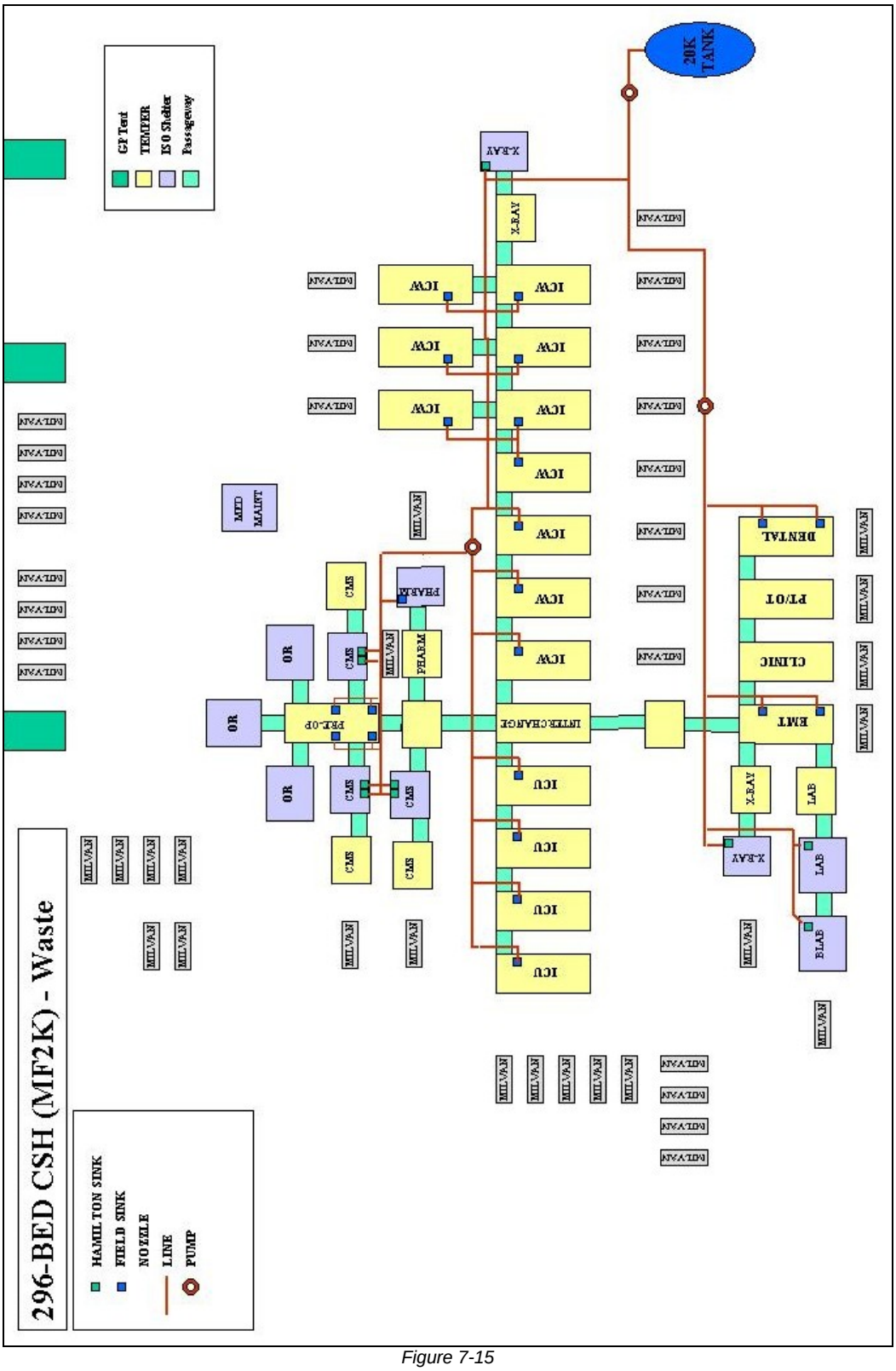

Figure 7-15
Recommended Layout for WWMS, MF2K, 296-Bed CSH

7-4. Assembly.

a. This paragraph provides some general guidelines and some rules on how to assemble the WWMS. Be prepared to alter the initial plan of the WWMS to be compatible with the Water Distribution Set and to accommodate movement or addition of sinks, funnels, or collection sites, and to reduce excessively long hose runs.

b. Use the sketch of the WWMS layout and position the funnel assemblies. Make all sink and funnel assembly connections. Place the ball valve assembly on the funnel assembly directly or immediately after a 5 foot section of hose. Ensure that all sink drains are plugged and all ball valve assemblies are closed. Add hose assembly sections as necessary to exit structures.

c. The Adapter, Sink (NSN: 6545-01-434-9630, PN: 13229E7224) is forced into the flexible pipe extension of a Hamilton Sink. The universal quick disconnect coupling half is connected to the WWMS.

WARNING

To avoid possible contamination, wastewater hose assemblies should never be stored with fresh water hose assemblies. Waste hoses should not be allowed to drip or discharge wastewater onto components of the Water Distribution system.

d. Remove the existing field sink drain hose by unscrewing the ¾ inch hose coupling assembly under the sink. Replace it with the Hose Assembly, Rubber (NSN: 6545-01-434-9627, PN: 13229E7226). Following connection the universal quick disconnect coupling half is connected to the WWMS.

e. Starting at the sink drain and funnel hose assemblies, lay out the hose sections to connect to the trunk lines. Lay out the trunk lines and determine where the Wye, Quick Disconnect (NSN: 4730-00-496-5952, PN: WW-C-633-M) will be required. Connect all hose assemblies, using the Wye fittings, where necessary, to complete the system.

Figure 7-16
Wye, Quick Disconnect

CAUTION

Be sure to check the condition of the gaskets on the hose fittings as you assemble the hoses. Do not drag the hoses, you will damage the hose and the fittings.

CAUTION

To ensure proper seating of the fittings, remove all burrs from the fittings using a file (located in the WDWMS Maintenance Set).

WARNING

To avoid injury, limit the amount of hose carried by one person.

f. Connect a 5-foot piece of hose to the funnel and connect the Valve, Ball (NSN: 4820-01-440-5916, PN: 13225E7225) to the 5-foot hose.

g. Position the Pump Assembly, Diaphragm (NSN: 4320-01-440-7388, PN: 13229E7222) as close to the collection site as possible. Long hose runs on the discharge side reduce the pump's capacity.

NOTE: Prior to EVERY setup and use, the operator/maintainer is required to install a reducing coupling and a universal quick disconnect coupling half to the intake side of the pump (it has male threads). The discharge side of the pump has female threads and requires the installation of a 4 inch pipe nipple, a reducing coupling and a universal quick disconnect coupling half.

CAUTION

During installation of the pipe adapters, do not screw the pipe nipple more than 5/8-inch into the discharge port of the Pump Assembly, Diaphragm.

CAUTION

On the Pump Assembly, Diaphragm, be sure to remove the breather filler plug seal before operation. Using pliers to remove, pull the 1-inch long "spaghetti" shaped plastic from the hole drilled horizontally through the breather plug.

CAUTION

The Pump Assembly, Diaphragm should be located at the lowest practical elevation and as close to the evacuation site as possible.

CAUTION

If possible, avoid allowing debris to enter the system. The Pump and Hose Assemblies are capable of passing some solids, however, inducing solids into the system should be avoided.

h. Connect the Pump Assembly, Diaphragm to an approved power source. While the Water Distribution system is being flushed, turn on the pump. Observe the system to ensure that there are no leaks and that the pump is working on both intake (suction) and discharge sides. Check tightness of each connection by pouring about one gallon of water into the drain of each sink and funnel to ensure that there are no leaks and that the pump is working properly.

7-5. Operation

a. Monitor the hose assemblies for leaks in the fittings and in the hose.

b. Monitor the evacuation site for leaks and spills. This system is designed to provide collection of the wastewater for evacuation from the site. Coordinate with Preventive Medicine personnel within the Theater to periodically neutralize the collected waste water and evacuate the material from the hospital site for further treatment or disposal.

c. Inspection of the pump.

On a daily basis.

(1) Check the valves. If the discharge valve does not seat properly, vacuum lift is lost. If the intake valve does not seal, pump efficiency will be lost.

(2) Check the diaphragm for leaks and wear.

(3) Grease the eccentric drive daily with 4 to 6 strokes of a grease gun.

CAUTION

Always keep the sink drains plugged when not actually draining water. Leaving them open will degrade the system and may burn out the Pump Assembly.

NOTE

FAILURE TO PERFORM DAILY PMCS (TO INCLUDE GREASE) WILL RESULT IN DECREASED LIFE TO THE PUMP UNIT.

7-6. Disassembly

a. The procedures discussed enable you to disassemble the system in a manner that is both safe

and efficient. The procedure is intended to be independent of any actions associated with the disassembly of the hospital. However, hose lines located inside a TEMPER must be removed before the tent can be disassembled.

WARNING

Use of non-sterile disposable rubber gloves is recommended when handling wet components of the WWMS. Contact Preventive Medicine personnel for further guidance on this subject.

b. Prior to disassembly of the WWMS, prepare at least 5-gallons of disinfectant solutions. The solution is made by mixing 16-ounces (approximately 2-cups) of household bleach (Sodium Hypochlorite, 0.525%) into 5-gallons of potable water. Use a 5-gallon "Jerry Can" for holding the disinfectant. The working solution is corrosive and will bleach items made of cloth and other liquid absorbing material. Take care not to spill the solution on clothing and boots.

c. Locate the sink or funnel at the most distant location of the medical facility. **NOTE**: there may be duplicate distant locations, so additional disinfectant should be prepared. With the system in normal operation, pour about one gallon of disinfectant into the plugged sink or funnel (closed ball valve). Allow the solution to sanitize the sink or funnel part for a minute, then remove the sink plug or open the ball valve. Allow the disinfectant solution to be drawn into the WWMS hoses and to the collection tank.

d. Use the disinfectant solution for **ALL** sink and funnel locations. More disinfectant solution may be necessary to properly sanitize those components.

e. Shut down the pump when the sound changes (to appear that it pumping air instead of liquid) to indicate that ALL disinfectant solution has passed through the system and is now in the collection tank.

NOTE

Allow the pump to remove as much of the disinfectant solution as possible before disassembly.

f. Begin disassembly of the WWMS at the point farthest form the collection tank or where TEMPER must be taken down.

NOTE

As wastewater hoses become disconnected, realize that some liquid may be trapped within the hose. Take action to place the lowest point of hoses where they can drain without leakage on TEMPER flooring or on tent material.

g. Disconnect the hoses from the sink or funnel, one at a time. Ensure that recently disconnected hose is raised high enough so that any liquid will drain out.

CAUTION

When removing hoses from a TEMPER, use caution to ensure that the fittings do not damage the tent flooring.

h. Do not replace the field sink drain hose assemblies. The new drain hose assemblies installed as part of this system will remain with the field sinks. The old, unused drain hose assemblies may be stored with the equipment or handed to medical maintenance personnel.

i. Allow sufficient time for the hose assemblies and other components to dry out or otherwise reduce the liquid trapped in the hoses to manageable levels.

j. Separate the Wye fittings and the Hamilton Sink drain adapters for storage.

k. Collect all hose assemblies at the location of the Skip Box, Materiel Handling. Place one end of a hose assembly against the inside wall of a cage. Feed the longer hoses into the cage first and work toward the center. Use the shorter pieces to fill in the voids in the center.

l. As much as possible, store similar fittings together.

m. Disconnect the pump from its power source and wind the cord around the handle. This will keep it from dragging when the pump is moved.

n. Remove the adapter fittings installed on the suction and discharge chambers of the pump. Soak these components in the sanitizing solution for at least one minute.

NOTE

On disassembly of the pump, remove the inlet and outlet fittings to prevent breaking the suction or discharge chamber castings.

o. Tilt the pump so that its suction chamber is up and the discharge chamber is aimed towards the ground. Pour one gallon of the sanitizing solution into the suction chamber and allow it to run out the discharge chamber. Do not let the liquid enter the pump motor.

p. Secure or tie the fittings, removed in step *i.* to the pump handle. This will keep them from becoming lost during transport or storage.

q. Physically look over the work area to ensure that no fittings or hose assemblies have been overlooked.

Prior to moving the WWMS, ensure that all components of the set are together. Use the inventory list to ensure that nothing is missing.

7-7. Preventive Maintenance. The following preventative checks and services should be done daily in addition to the operational checks detailed in paragraph 7-5, above.

They should be done before storing or moving the system.

a. Pump. See separate Chapter.

b. Hose Assemblies. Check hoses for abrasions, cuts, or gouges. Check for:

(1) The presence of bulges in the hose or seepage at the hose fittings during operations.

(2) Inspect for rust and deterioration on coupling halves and clamps.

c. Funnel Assembly. Cleaning the screen requires removing the funnel from the stand assembly prior to removal of the screen. If an attempt is made to remove the screen before removing the funnel from the stand assembly, the screen may tilt. This action may allow large solid material to be introduced into the WWMS and could clog hoses or damage the pump. Clean funnel assembly with sanitizing solution.

7-8. Repair Procedures. The Water Distribution Set and the WWMS are supported by the Waste-Water Augmentation Set (WWAS) which includes components for expansion of the Water Distribution and WWMS. An additional set, the Water Distribution and Wastewater Maintenance Set contains an initial stock of repair parts and tools necessary to maintain the system. Both sets are fielded with the system. As parts are replaced or used in support of the WDS and WWMS the user is responsibility to replenish the components as needed.

a. Pump. See separate Chapter.

b. Broken, Torn or Punctured Hoses. The principle behind repairing damaged hose is to make two good hoses from one damaged hose..

(1) Use a hacksaw to cut the hose squarely and remove the damaged section. If the short section is 2-feet or less, remove and retain the universal coupling if it is in useable condition. Dispose of hose pieces shorter than 2-feet.

NOTE

Wash hacksaw blade in a dilute bleach solution or hot soapy water after each use to prevent contamination of the hacksaw blade.

(2) Place a hose clamp (from the maintenance set) over the newly cut end.

(3) Insert a Universal Quick Disconnect Coupling Half in the cut end as far as it will go.

(4) Position the hose clamp near the body of the coupling half.

(5) Tighten the clamp and trim the excess metal strip. Excess metal that is not trimmed must be flattened against the clamp with a hammer. If there are sharp edges, remove them with a small file.

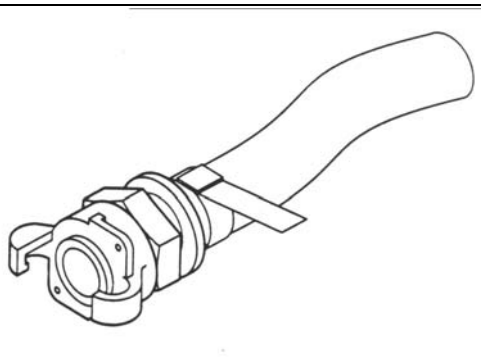

Figure 7-17
Hose Repair

NOTE

The cut ends of banding material are sharp enough to cause deep cuts and tear clothing. Use a file to dull or smooth the sharp edge. Use tape to cover the edge if necessary to prevent cuts during handling.

(6) Repeat steps (2) through (5) for the other piece of hose.

(7) Do not attempt to repair the Hose Assembly, Rubber (NSN: 6545-01-434-9627, PN: 13229E7226) hose if it breaks within 1 foot of the coupling assembly. Replace the entire assembly.

c. Universal Quick Disconnect, Coupling Half, Hose Fittings and Wye fittings. The only repair performed on these parts consists of replacement of the rubber gaskets. Cracked or broken fittings must be replaced.

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CHAPTER 8

WASTEWATER MANAGEMENT SET (WWMS)
Medical Re-engineering Initiative (MRI) 84-Bed Configuration

OPERATOR INSTRUCTION, PMCS, AND REPAIR INSTRUCTIONS

8-1. Introduction

a. This set is part of the Water Distribution and Wastewater Management System (WDWWMS), DEPMEDS, MRI 84-Bed. For brevity in this chapter, the wastewater management set will be identified as a WWMS.

b. This chapter describes the assembly, operation and disassembly of the WWMS. This set allows for the evacuation of wastewater generated by hospitals up to 84 beds.

c. The reason for having a WWMS is to collect and later dispose of hospital wastewater in a safe manner. In addition, it aids in the control of infectious and communicable diseases.

d. In the practice of safe hygiene, it is essential to maintain complete separation of the Water Distribution Set and the WWMS.

8-2. Components

a. *Coupling Halves.* The Universal Quick Disconnect (or coupling half) is made of galvanized steel and incorporates a rubber gasket to provide a watertight seal when the halves are connected. Two coupling halves will allow the connection of:

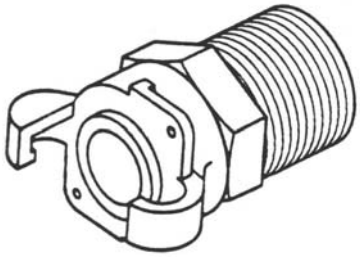

Figure 8-1
Coupling Half
Universal Quick Disconnect

(1) two hoses,

(2) a hose and the Pump Assembly, Diaphragm (NSN: 4320-01-440-7388),

(3) a hose and a Valve, Ball (NSN: 4820-01-440-5916)

(4) a hose and a Wye, Quick Disconnect (NSN: 4730-00-496-5952)

With two exceptions, all connections in the WWMS use universal quick disconnect. The two exceptions are

- Sink Drain Adapter
- Hose Assembly, Rubber used with the Field Sinks and the Ultrasonic Cleaners.

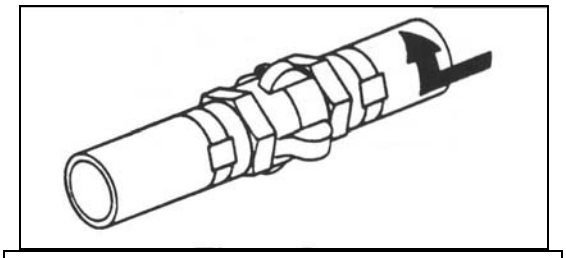

Figure 8-2
Coupling Connection

b. *Water Storage Tanks.* Units are authorized the following types and quantities of water storage tanks.

Types

- Tank, Fabric, Collapsible, 5,000 Gallon Capacity

Requirements

	5K Gal
MRI 84	1

b. *Hose Assembly*. All hoses in the WWMS are black in color. These hoses are not used for any purpose other than wastewater evacuation. Each hose assembly has a universal quick disconnect at each end. Do not use black hose to replace or repair any potable water (sand color) hose. Hoses in the set are:

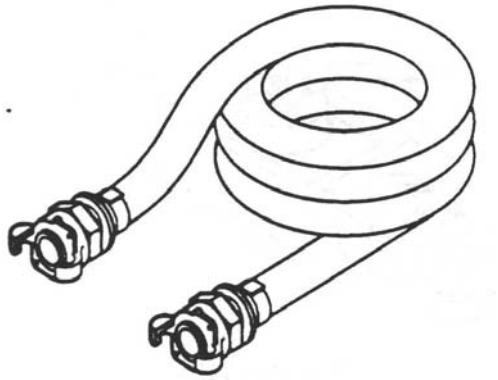

Figure 8-3
Hose Assembly

Hose Assembly, Rubber
NSN: 4730-01-434-9638
PN: 13230E5746-4
(1½-inch x 50-feet)

Hose Assembly, Rubber
NSN: 4730-01-434-9594
PN: 13229E7223-2
(1-inch x 10-feet)

Hose Assembly, Rubber
NSN: 4730-01-434-9605
PN: 13229E7223-3
(1-inch x 20-feet)

Hose Assembly, Rubber
NSN: 6545-01-434-9646
PN: 13229E7223-1
(1-inch x 5-feet)

Hose Assembly, Rubber
NSN: 6545-01-434-9649
PN: 13229E7223-4
(1-inch x 50-feet)

d. *Adapter, Sink.* (NSN: 6545 -01-434-9630, PN: 13229E7224) The sink adapter consists of a pipe to hose adapter, a reducing pipe coupling, and a universal quick disconnect coupling half.

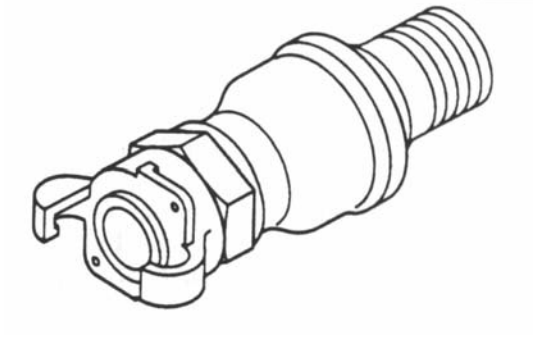

Figure 8-4
Adapter, Sink (for Hamilton Sink)

e. *Hose Assembly, Rubber (Field Sink Drain Hose Assembly)*. (NSN: 6545-01-434-9627, PN: 13229E7226) This assembly consists of a section of black hose with a hose coupling assembly on one end and a universal quick disconnect coupling half on the other end. This assembly replaces the existing drain hose on field sinks. The hose assembly is also used to drain the ultrasonic cleaner.

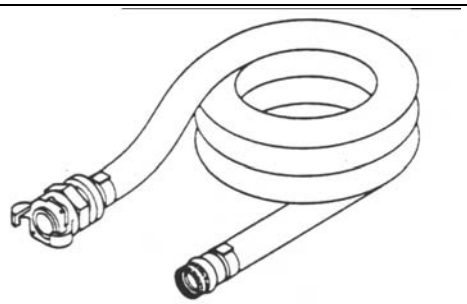

Figure 8-5
Hose Assembly, Rubber
(Drain Hose for Field Sinks)

f. *Stand Assembly, Distribution Nozzle.* (NSN: 4930-01-120-7426, PN: 13225E9140) The Stand Assembly is a collapsible steel tripod. It has chains attached to the legs to prevent them from opening too far. Each leg has a hook at the top to hang the Funnel Assembly.

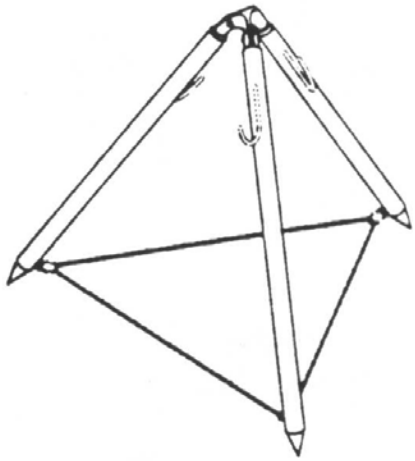

Figure 8-6
Stand Assembly, Distribution Nozzle

g. *Funnel Assembly.* (NSN: 6545-01-434-9587, PN: 13229E7229) The Funnel Assembly consists of a large black funnel with a screen fitted inside, a universal quick disconnect coupling half secured to a discharge tube, and three hooks for hanging the funnel from the Stand Assembly, Distribution Nozzle.

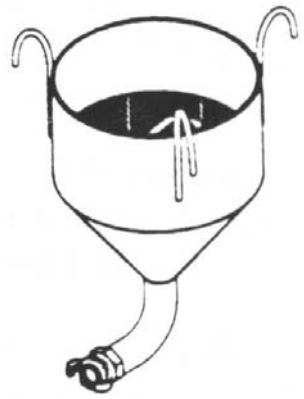

Figure 8-7
Funnel Assembly

WARNING

The Water Distribution Nozzle and the Waste Funnel Assembly should not be suspended from the same Stand Assembly. This could result in contamination of the water system. Use one Stand Assembly for the nozzle and one Stand Assembly for the Funnel Assembly.

h. *Valve, Ball.* (NSN: 4820-01 -440-5916, PN: 13225E7225). The ball valve provides a means to close off the WWMS. It is used near the funnel and stand assemblies.

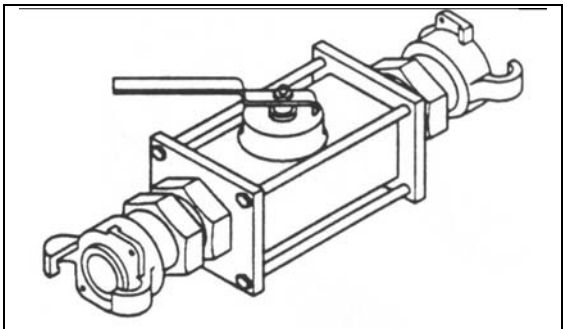

Figure 8-8
Valve, Ball

i. Skip Box, Material Handling. This cage-like device is designed for the storage of hoses and fittings.

Figure 8-9
Skip Box, Material Handling

8-3. Principles of Installation.

The information in this chapter provides guidance to help plan the physical layout for the hospital. Obtain a scale drawing or diagram of the deployed hospital and sketch the layout of the Water Distribution Set and the WWMS on this diagram. Depending on the size and configuration of the hospital, plan on at least one primary loop, and if weather conditions warrant, the use of one or more secondary loops.

a. *Location of Wastewater Collection Site.* The collection site is the most important factors in setting up the WWMS. The terrain as well as the plans of the Unit Commander will dictate placement and the type of collection site(s).

- The collection site must be at least 300 feet (100 yards) from the hospital boundary.

- It should must not be located on higher terrain that the

freshwater tank(s). Position the collection site in an area lower than the rest of the hospital and away from the fresh water tank(s). This will aid the pump in drawing the wastewater and, if a leak occurs, prevent the wastewater from contaminating the other areas of the hospital complex.

- Sufficient space needs to be allocated to ensure wastewater does not overflow into areas where its presence would be undesirable.

- Allow space for wastewater evacuation vehicles access to the wastewater tank(s).

WARNING

The Wastewater Collection Site MUST be at least 300 feet (100 yards) from the hospital boundary, and should never be on a higher terrain level than the freshwater tank(s).

b. *Location of Pumps.* Locate pumps on each loop close to the collection site. Note that the power cable on the pump is 40 feet long. **DO NOT USE AN EXTENSION CORD.** Elevate electrical connections (plugs, etc.) on wooden blocks above areas where puddles may form. The pump provided [Pump Assembly, Diaphragm, NSN: 4320-01-440-7388, PN: 13229E7222] is driven by a single-phase 115 volt, 60-Hertz electric motor. The motor should be supplied by a dedicated branch circuit protected by a fuse or circuit breaker rated at no more than 15 amps.

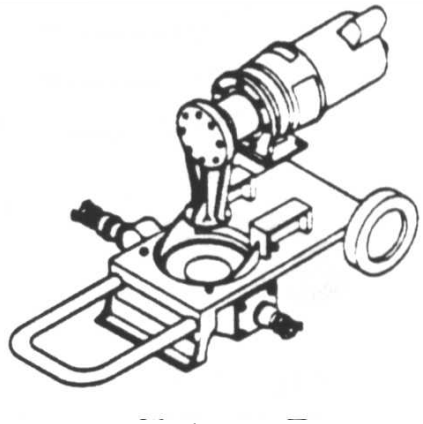

Figure 8-10
Pump Unit, Reciprocating

c. *Location of Sinks and Water Distribution Connections.* The WWMS collects waste water from sinks and drain funnels. The location of Water Distribution Set components will determine the layout of the WWMS hoses and receptacles. They should be located to preclude cross-contamination of the potable water.

d. *Location of Hose Protection Channels.* Hoses should not cross vehicle routes. Hoses crossing pedestrian paths should be kept to a minimum. If a hose must cross a TEMPER, do so at a passageway, and use a hose protection channel. Where possible, allow waste and fresh water hoses to share a hose protection channel.

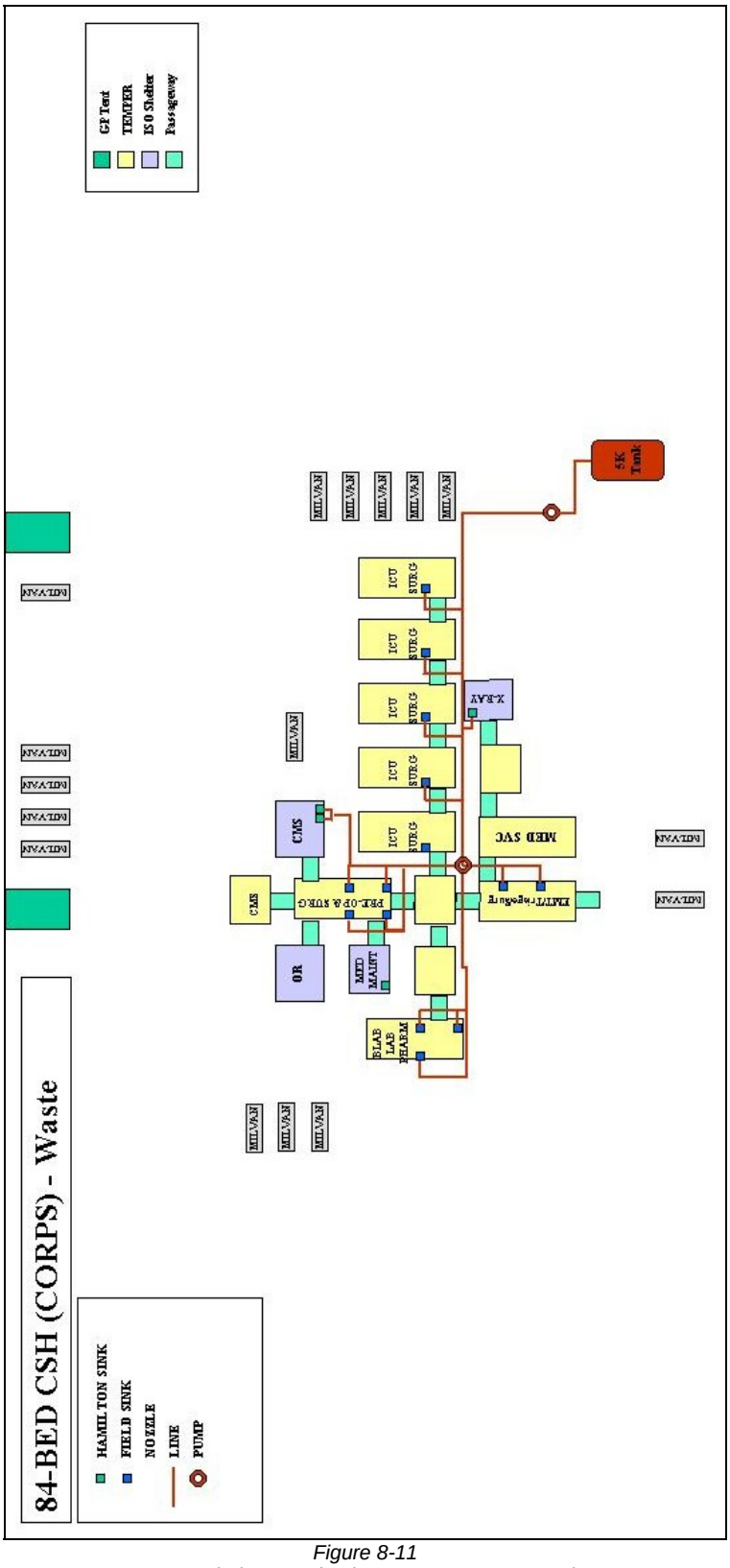

Figure 8-11
Recommended Layout for the WWMS, MRI, 84-Bed CSH

8-4. Assembly.

a. This paragraph provides general guidelines and some rules on how to assemble the WWMS. Be prepared to alter the initial plan of the WWMS to be compatible with the Water Distribution Set and to accommodate movement or addition of sinks, funnels, or collection sites, and to reduce excessively long hose runs.

b. Use the sketch of the WWMS layout and position the funnel assemblies. Make all sink and funnel assembly connections. Place the ball valve assembly on the funnel assembly directly or immediately after a 5 foot section of hose. Ensure that all sink drains are plugged and all ball valve assemblies are closed. Add hose assembly sections as necessary to exit structures.

c. The Adapter, Sink (NSN: 6545-01-434-9630, PN: 13229E7224) is forced into the flexible pipe extension of a Hamilton Sink. The universal quick disconnect coupling half is connected to the WWMS.

WARNING

To avoid possible contamination, wastewater hose assemblies should never be stored with fresh water hose assemblies. Waste hoses should not be allowed to drip or discharge wastewater onto components of the Water Distribution system.

d. Remove the existing field sink drain hose by unscrewing the ¾ inch hose coupling assembly under the sink. Replace it with the Hose Assembly, Rubber (NSN: 6545-01-434-9627, PN: 13229E7226). Following connection the universal quick disconnect coupling half is connected to the WWMS.

e. Starting at the sink drain and funnel hose assemblies; lay out the hose sections to connect to the trunk lines. Lay out the trunk lines and determine where the Wye, Quick Disconnect (NSN: 4730-00-496-5952, PN: WW-C-633-M) will be required. Connect all hose assemblies, using the Wye fittings, where necessary, to complete the system.

Figure 8-12
Wye, Quick Disconnect

CAUTION

Be sure to check the condition of the gaskets on the hose fittings as you assemble the hoses. Do not drag the hose; you will damage the hose and the fittings.

CAUTION

To ensure proper seating of the fittings, remove all burrs from the fittings using a file (located in the WDWMS Maintenance Set).

WARNING

To avoid injury, limit the amount of hose carried by one person.

f. Connect a 5-foot piece of hose to the funnel and connect the Valve, Ball (NSN: 4820-01-440-5916, PN: 13225E7225) to the 5-foot hose.

g. Position the Pump Assembly, Diaphragm (NSN: 4320-01-440-7388, PN: 13229E7222) as close to the collection site as possible. Long hose runs on the discharge side reduce the pump's capacity.

NOTE: Prior to EVERY setup and use, the operator/maintainer is required to install a reducing coupling and a universal quick disconnect coupling half to the intake side of the pump (it has male threads). The discharge side of the pump has female threads and requires the installation of a 4-inch pipe nipple, a reducing coupling and a universal quick disconnect coupling half.

CAUTION

During installation of the pipe adapters, do not screw the pipe nipple more than 5/8-inch into the discharge port of the Pump Assembly, Diaphragm.

CAUTION

On the Pump Assembly, Diaphragm, be sure to remove the breather filler plug seal before operation. Using pliers to remove, pull the 1-inch long "spaghetti" shaped plastic from the hole drilled horizontally through the breather plug.

CAUTION

The Pump Assembly, Diaphragm should be located at the lowest practical elevation and as close to the evacuation site as possible.

CAUTION

If possible, avoid allowing debris to enter the system. The Pump and Hose Assemblies are capable of passing some solids, however, inducing solids into the system should be avoided.

h. Connect the Pump Assembly, Diaphragm to an approved power source. While the Water Distribution system is being flushed, turn on the pump. Observe the system to ensure that there are no leaks and that the pump is working on both intake (suction) and discharge sides. Check tightness of each connection by pouring about one gallon of water into the drain of each sink and funnel to ensure that there are no leaks and that the pump is working properly.

8-5. Operation

a. Monitor the hose assemblies for leaks in the fittings and in the hose.

b. Monitor the evacuation site for leaks and spills. This system is designed to provide collection of the wastewater for evacuation from the site. Coordinate with Preventive Medicine personnel within the Theater to periodically neutralize the collected wastewater and evacuate the material from the hospital site for further treatment or disposal.

c. Inspection of the pump.

On a daily basis.

(1) **Check the valves.** If the discharge valve does not seat properly vacuum lift is lost. If the intake valve does not seal, pump efficiency will be lost.

(2) Check the diaphragm for leaks and wear.

(3) Grease the eccentric drive daily with 4 to 6 strokes of a grease gun.

NOTE

FAILURE TO PERFORM DAILY PMCS (TO INCLUDE GREASE) WILL RESULT IN DECREASED LIFE TO THE PUMP UNIT.

CAUTION

Always keep the sink drains plugged when not actually draining water. Leaving them open will degrade the system and may burn out the Pump Assembly.

8-6. Disassembly

a. The procedures discussed enables you to disassemble the

system in a manner that is both safe and efficient. The procedure is intended to be independent of any actions associated with the disassembly of the hospital. However, hose lines located inside a TEMPER must be removed before the tent can be disassembled.

WARNING

Use of non-sterile disposable rubber gloves is recommended when handling wet components of the WWMS. Contact Preventive Medicine personnel for further guidance on this subject.

b. Prior to disassembly of the WWMS, prepare at least 5 gallons of disinfectant solutions. The solution is made by mixing 16 ounces (approximately 2 cups) of household bleach (Sodium Hypochlorite, 0.525%) into 5 gallons of potable water. Use a 5- gallon “Jerry Can” for holding the disinfectant. The working solution is corrosive and will bleach items made of cloth and other liquid absorbing material. Take care not to spill the solution on clothing and boots.

c. Locate the sink or funnel at the most distant location of the medical facility. NOTE: there may be duplicate distant locations, so additional disinfectant should be prepared. With the system in normal operation, pour about one gallon of disinfectant into the plugged sink or funnel (closed ball valve). Allow the solution to sanitize the sink or funnel part for a minute, then remove the sink plug or open the ball valve. Allow the disinfectant solution to be drawn into the WWMS hoses and to the collection tank.

d. Use the disinfectant solution for ALL sink and funnel locations. More disinfectant solution may be necessary to properly sanitize those components.

e. Shut down the pump when the sound changes (to appear that it pumping air instead of liquid) to indicate that ALL disinfectant solution has passed through the system and is now in the collection tank.

NOTE

Allow the pump to remove as much of the disinfectant solution as possible before disassembly.

f. Begin disassembly of the WWMS at the point farthest form the collection tank or where TEMPER must be taken down.

NOTE

As wastewater hoses become disconnected, realize that some liquid may be trapped within the hose. Take action to place the lowest point of hoses where they can drain without leakage on TEMPER flooring or on tent material.

g. Disconnect the hoses from the sink or funnel, one at a time. Ensure that recently disconnected hose is raised high enough so that any liquid will drain out.

CAUTION
When removing hoses from a TEMPER, use caution to ensure that the fittings do not damage the tent flooring.

h. Do not replace the field sink drain hose assemblies. The new drain hose assemblies, installed as part of this system will remain with the field sinks. The old, unused drain hose assemblies may be stored with the equipment or handed to medical maintenance personnel.

i. Allow sufficient time for the hose assemblies and other components to dry out or otherwise reduce the liquid trapped in the hoses to manageable levels.

j. Separate the Wye fittings and the Hamilton Sink drain adapters for storage.

k. Collect all hose assemblies at the location of the Skip Box, Materiel Handling.

l. As much as possible, store similar fittings together.

m. Disconnect the pump from its power source and wind the cord around the handle. This will keep it from dragging when the pump is moved.

n. Remove the adapter fittings Installed on the suction and discharge chambers of the pump. Soak these components in the sanitizing solution for at least one minute.

NOTE
On disassembly of the pump, remove the inlet and outlet fittings to prevent breaking the suction or discharge chamber castings.

o. Tilt the pump so that its suction chamber is up and the discharge chamber is aimed towards the ground. Pour one gallon of the sanitizing solution into the suction chamber and allow it to run out the discharge chamber. Do not let the liquid enter the pump motor.

p. Secure or tie the fittings, removed in step *i.* to the pump handle. This will keep them from becoming lost during transport or storage.

q. Physically look over the work area to ensure that no fittings or hose assemblies have been overlooked.

Prior to moving the WWMS, ensure that all components of the set are together. Use the inventory list to ensure that nothing is missing.

8-7. Preventive Maintenance. The following preventative checks and services should be done daily in addition to the operational checks detailed in paragraph 8-5, above. They should be done before storing or moving the system.

a. Pump. See separate chapter.

b. Hose Assemblies. Check hoses for abrasions, cuts, or gouges. Check for:

(1) The presence of bulges in the hose or seepage at the hose fittings during operations.

(2) Inspect for rust and deterioration on coupling halves and clamps.

c. Funnel Assembly. Cleaning the screen requires removing the funnel from the stand assembly prior to removal of the screen. If an attempt is made to remove the screen before removing the funnel from the stand assembly, the screen may tilt. This action may allow large solid material to be introduced into the WWMS and could clog hoses or damage the pump. Clean funnel assembly with sanitizing solution.

8-8. Repair Procedures. The Water Distribution Set and the WWMS are supported by the Water Distribution and Wastewater Management System Maintenance Set that contains an initial stock of repair parts and tools necessary to maintain the system. This set is fielded with the system. As parts are replaced or used in support of the WDS and WWMS the user is responsibility to replenish the components as needed.

a. Pump. See separate chapter.

b. Broken, Torn or Punctured Hoses. The principle behind repairing damaged hose is to make two good hoses from one damaged hose.

(1) Use a hacksaw to cut the hose squarely and remove the damaged section. If the short section is 2 feet or less, remove and retain the universal coupling if it is in useable condition. Dispose of hose pieces shorter than 2-feet.

NOTE

Wash hacksaw blade in a dilute bleach solution or hot soapy water after each use to prevent contamination of the hacksaw blade.

(2) Place a hose clamp (from the maintenance set) over the newly cut end.

(3) Insert a Universal Quick Disconnect Coupling Half in the cut end as far as it will go.

(4) Position the hose clamp near the body of the coupling half.

(5) Tighten the clamp and trim the excess metal strip. Excess metal that is not trimmed must be flattened against the clamp with a hammer. If there are sharp edges, remove them with a small file.

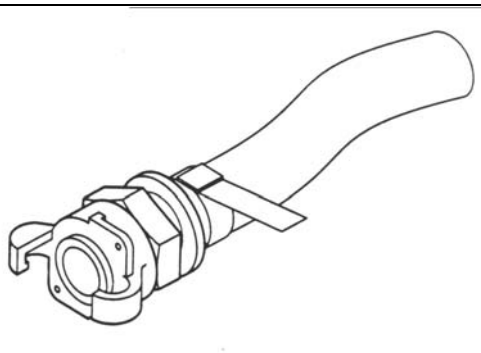

Figure 8-13
Hose Repair

NOTE

The cut ends of banding material are sharp enough to cause deep cuts and tear clothing. Use a file to dull or smooth the sharp edge. Use tape to cover the edge if necessary to prevent cuts during handling.

(6) Repeat steps (2) through (5) for the other piece of hose.

(7) Do not attempt to repair the Hose Assembly, Rubber (NSN: 6545-01-434-9627, PN: 13229E7226) hose if it breaks within 1-foot of the coupling assembly. Replace the entire assembly.

c. Universal Quick Disconnect, Coupling Half, Hose Fittings and Wye fittings. The only repair performed on these parts consists of replacement of the rubber gaskets. Cracked or broken fittings must be replaced.

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CHAPTER 9

WASTEWATER MANAGEMENT SET (WWMS)
Medical Re-engineering Initiative (MRI) 164-Bed Configuration

OPERATOR INSTRUCTIONS, PMCS, AND REPAIR INSTRUCTIONS

9-1. Introduction

a. This set is a subsystem of the Water Distribution and Wastewater Management System (WDWWMS), DEPMEDS, Medical Re-engineering Initiative (MRI) MRI 164-Bed. For brevity in this chapter, the wastewater management set will be identified as a WWMS MRI 164.

b. This chapter describes the assembly, operation and dis-assembly of the WWMS MRI 164. This set allows for the evacuation of wastewater generated by hospitals up to 164 beds.

c. The reason for having a WWMS MRI 164 is to collect and later dispose of hospital wastewater in a safe manner. In addition, it aids in the control of infectious and communicable diseases.

d. In the practice of safe hygiene, it is essential to maintain complete separation of the WDS MRI 164 and the WWMS MRI 164.

9-2. Components

a. *Coupling Halves.* The Universal Quick Disconnect (or coupling half) is made of galvanized steel and incorporates a rubber gasket to provide a watertight seal when the halves are connected. Two coupling halves will allow the connection of:

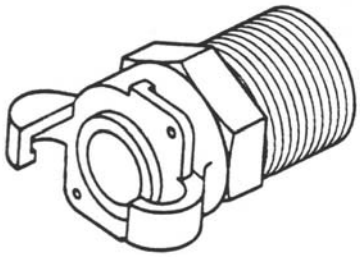

Figure 9-1
Coupling Half
Universal Quick Disconnect

(1) two hoses,

(2) a hose and the Pump Assembly, Diaphragm (NSN: 4320-01-440-7388),

(3) a hose and a Valve, Ball (NSN: 4820-01-440-5916)

(4) a hose and a Wye, Quick Disconnect (NSN: 4730-00-496-5952)

With two exceptions, all connections in the WWMS MRI 164 use universal quick disconnect. The two exceptions are

- Sink Drain Adapter
- Hose Assembly, Rubber used with the Field Sinks and the Ultrasonic Cleaners.

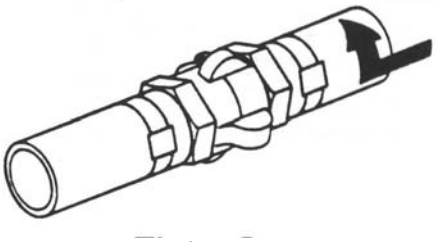

Figure 9-2
Coupling Connection

b. *Water Storage Tanks.* Units are authorized the following types and quantities of water storage tanks.

Types

- LIN T12938 – Tank Fabric, Collapsible, 20,000 Gallon Capacity

Figure 9-3
Tank Fabric Collapsible, 20,000 Gallon
Laid Out on Ground

Requirements

	T12938
20K Gal	**1**

b. *Hose Assembly*. All hoses in the WWMS are black in color. These hoses are not used for any purpose other than wastewater evacuation. Each hose assembly has a universal quick disconnect at each end. Do not use black hose to replace or repair any potable water (sand color) hose. Hoses in the set are:

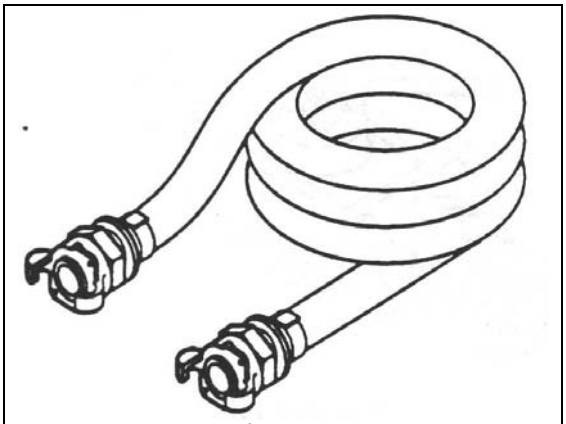

Figure 9-4
Hose Assembly

Hose Assembly, Rubber
NSN: 4730-01-434-9638
PN: 13230E5746-4
(1½-inch x 50-feet)

Hose Assembly, Rubber
NSN: 4730-01-434-9594
PN: 13229E7223-2
(1-inch x 10-feet)

Hose Assembly, Rubber
NSN: 4730-01-434-9605
PN: 13229E7223-3
(1-inch x 20-feet)

Hose Assembly, Rubber
NSN: 6545-01-434-9646
PN: 13229E7223-1
(1-nch x 5-eet)

Hose Assembly, Rubber
NSN: 6545-01-434-9649
PN: 13229E7223-4
(1-nch x 50-eet)

d. *Adapter, Sink.* (NSN: 6545 -01-434-9630, PN: 13229E7224) The sink adapter consists of a pipe to hose adapter, a reducing pipe coupling, and a universal quick disconnect coupling half.

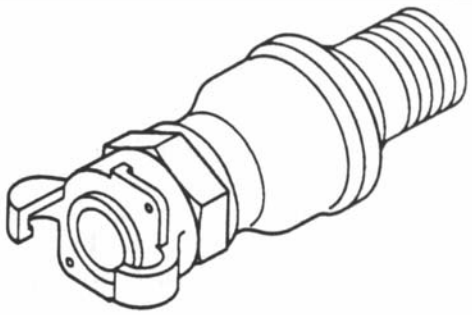

Figure 9-5
Adapter, Sink (for Hamilton Sink)

e. *Hose Assembly, Rubber (Field Sink Drain Hose Assembly)*. (NSN: 6545-01-434-9627, PN: 13229E7226) This assembly consists of a section of black hose with a hose coupling assembly on one end and a universal quick disconnect coupling half on the other end. This assembly replaces the existing drain hose on field sinks. The hose assembly is also used to drain the ultrasonic cleaner.

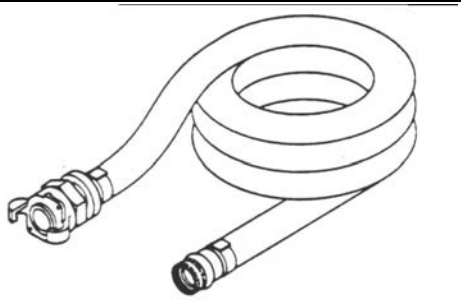

Figure 9-6
Hose Assembly, Rubber
(Drain Hose for Field Sinks)

f. *Stand Assembly, Distribution Nozzle.* (NSN: 4930-01-120-7426, PN: 13225E9140) The Stand Assembly is a collapsible steel tripod. It has chains attached to the legs to prevent them from opening too far. Each leg has a hook at the top to hang the Funnel Assembly.

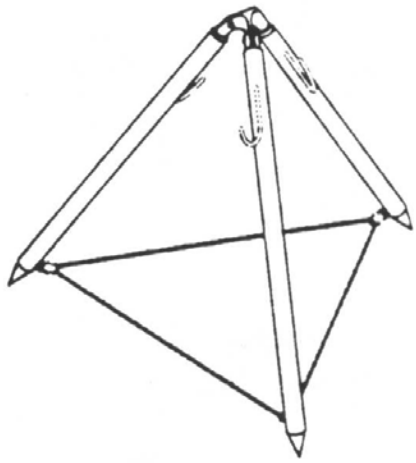

Figure 9-7
Stand Assembly, Distribution Nozzle

g. *Funnel Assembly.* (NSN: 6545-01-434-9587, PN: 13229E7229) The Funnel Assembly consists of a large black funnel with a screen fitted inside, a universal quick disconnect coupling half secured to a discharge tube, and three hooks for hanging the funnel from the Stand Assembly, Distribution Nozzle.

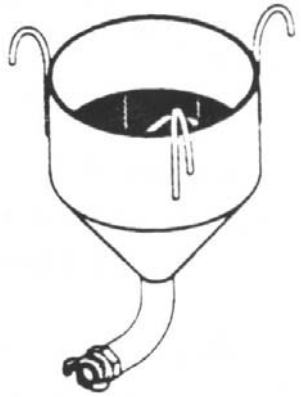

Figure 9-8
Funnel Assembly

WARNING

The Water Distribution Nozzle and the Waste Funnel Assembly should not be suspended from the same Stand Assembly. This could result in contamination of the water system. Use one Stand Assembly for the nozzle and one Stand Assembly for the Funnel Assembly.

h. *Valve, Ball.* (NSN: 4820-01-440-5916, PN: 13225E7225). The ball valve provides a means to close off the WWMS. It is used near the funnel and stand assemblies.

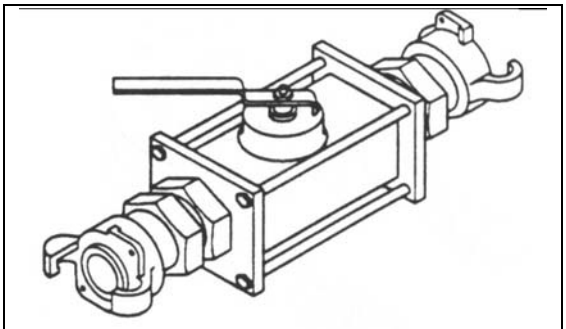

Figure 9-9
Valve, Ball

i. *Skip Box, Material Handling. This cage-like item* is designed to allow the hoses and components to be stored inside the assembly.

Figure 9-10
Skip Box, Material Handling

j. *Wye, Quick Disconnect* (NSN: 4730-00-496-5952, PN: WW-C-633-M). This fitting is used as a junction connection when fitting three hoses together, or when fitting the Funnel Assembly (NSN: 6545-01-434-9587, PN: 13229E7229) to the wastewater evacuation line.

9-3. Principles of Installation.

The information in this chapter provides guidance to help plan the physical layout for the hospital. Obtain a scale drawing or diagram of the deployed hospital and sketch the layout of the WDS MRI 164 and the WWMS MRI 164 on this diagram. Depending on the size and configuration of the hospital, plan on at least one primary loop, and if weather conditions warrant, the use of one or more secondary loops.

a. *Location of Wastewater Collection Site.* The collection site is the most important factors in setting up the WWMS MRI 164. The terrain as well as the plans of the Unit

Commander will dictate placement and the type of collection site(s).

- The collection site must be at least 300 feet (100 yards) from the hospital boundary.

- It should must not be located on higher terrain that the freshwater tank(s). Position the collection site in an area lower than the rest of the hospital and away from the fresh water tank(s). This will aid the pump in drawing the wastewater and, if a leak occurs, prevent the wastewater from contaminating the other areas of the hospital complex.

- Sufficient space needs to be allocated to ensure wastewater does not overflow into areas where its presence would be undesirable.

- Allow space for wastewater evacuation vehicles access to the wastewater tank(s).

WARNING

The Wastewater Collection Site MUST be at least 300 feet (100 yards) from the hospital boundary, and should never be on a higher terrain level than the freshwater tank(s).

b. *Location of Pumps.* Locate pumps on each loop close to the collection site. Note that the power cable on the pump is 40 feet long. **DO NOT USE AN EXTENSION CORD.** Elevate electrical connections (plugs, etc.) on wooden blocks above areas where puddles may form. The pump provided [Pump Assembly, Diaphragm, NSN: 4320-01-440-7388, PN: 13229E7222] is driven by a single-phase 115 volt, 60-Hertz electric motor. The motor should be supplied by a dedicated branch circuit protected by a fuse or circuit breaker rated at no more than 15 amps.

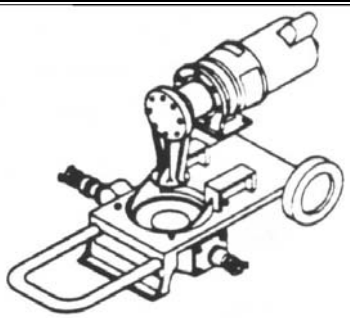

Figure 9-11
Pump

c. *Location of Sinks and Water Distribution Connections.* The WWMS MRI 164 collects wastewater from sinks and drain funnels. The location of WDS MRI 164 components will determine the layout of the WWMS MRI 164 hoses and receptacles. They should be located to preclude cross-contamination of the potable water.

d. *Location of Hose Protection Channels.* Hoses should not cross vehicle routes. Hoses crossing pedestrian paths should be kept to a minimum. If a hose must cross a TEMPER, do so at a passageway, and use a hose protection channel. Where possible, allow waste and fresh water hoses to share a hose protection channel.

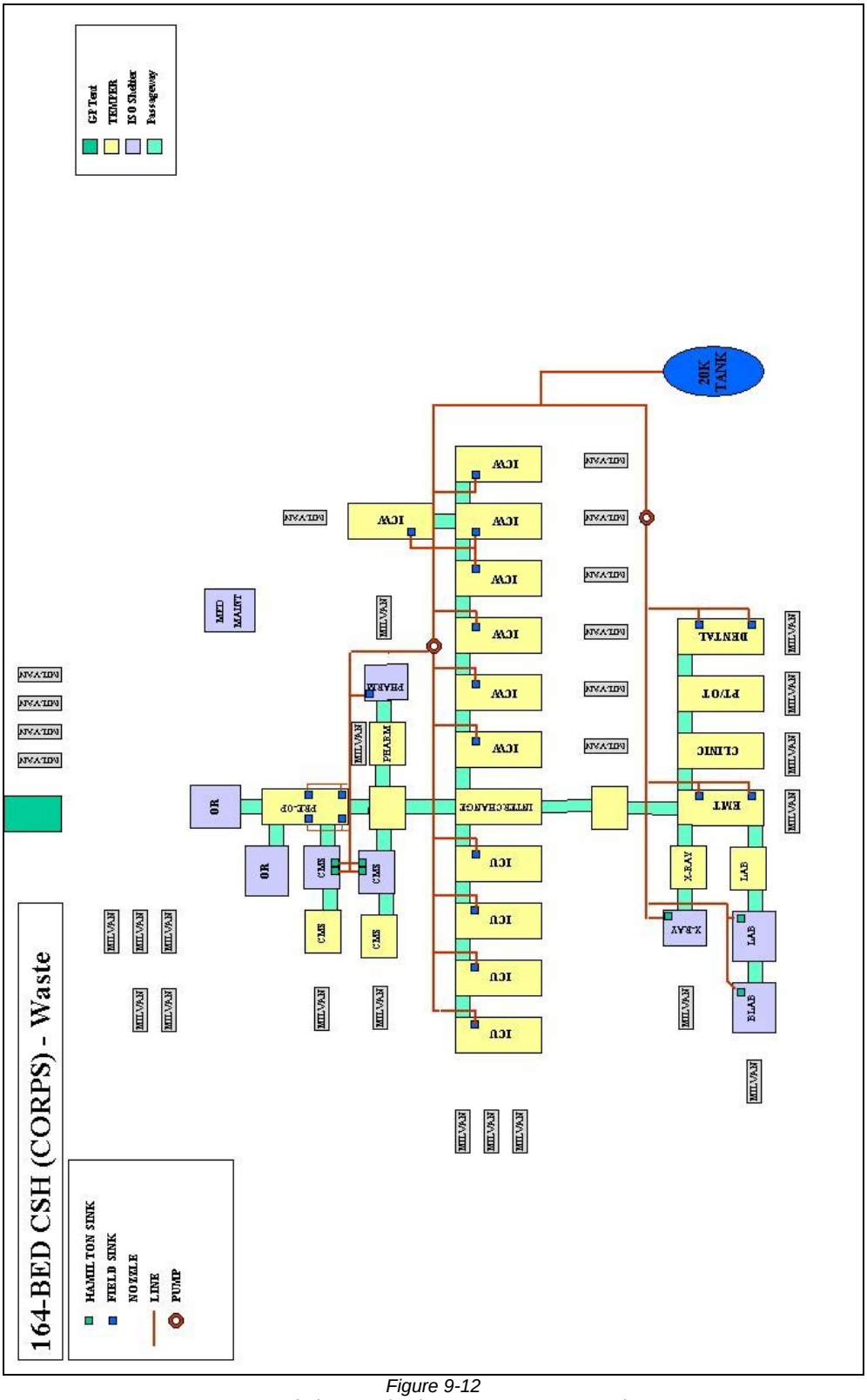

Figure 9-12
Recommended Layout for the WWMS, MRI 164-Bed CSH

9-4. Assembly.

a. This paragraph provides some general guidelines and some rules on how to assemble the WWMS MRI 164. Be prepared to alter the initial plan of the WWMS MRI 164 to be compatible with the WDS MRI 164 and to accommodate movement or addition of sinks, funnels, or collection sites, and to reduce excessively long hose runs.

b. Use the sketch of the WWMS MRI 164 layout and position the funnel assemblies. Make all sink and funnel assembly connections. Place the ball valve assembly on the funnel assembly directly or immediately after a 5 foot section of hose. Ensure that all sink drains are plugged and all ball valve assemblies are closed. Add hose assembly sections as necessary to exit structures.

c. The Adapter, Sink (NSN: 6545-01-434-9630, PN: 13229E7224) is forced into the flexible pipe extension of a Hamilton Sink. The universal quick disconnect coupling half is connected to the WWMS MRI 164.

WARNING

To avoid possible contamination, wastewater hose assemblies should never be stored with fresh water hose assemblies. Waste hoses should not be allowed to drip or discharge wastewater onto components of the Water Distribution system.

d. Remove the existing field sink drain hose by unscrewing the ¾ inch hose coupling assembly under the sink. Replace it with the Hose Assembly, Rubber (NSN: 6545-01-434-9627, PN: 13229E7226). Following connection the universal quick disconnect coupling half is connected to the WWMS MRI 164.

e. Starting at the sink drain and funnel hose assemblies; lay out the hose sections to connect to the trunk lines. Lay out the trunk lines and determine where the Wye, Quick Disconnect (NSN: 4730-00-496-5952, PN: WW-C-633-M) will be required. Connect all hose assemblies, using the Wye fittings, where necessary, to complete the system.

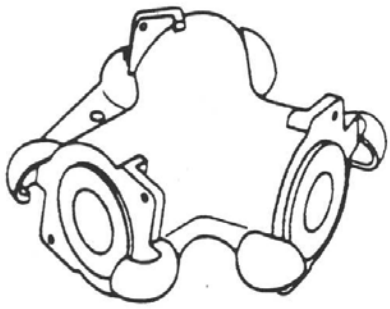

Figure 9-13
Wye, Quick Disconnect

CAUTION
Be sure to check the condition of the gaskets on the hose fittings as you assemble the hoses. Do not drag the hose; you will damage the hose and the fittings.

CAUTION
To ensure proper seating of the fittings, remove all burrs from the fittings using a file (located in the WDWMS MRI 164 Maintenance Set).

WARNING
To avoid injury, limit the amount of hose carried by one person.

f. Connect a 5-foot piece of hose to the funnel and connect the Valve, Ball (NSN: 4820-01-440-5916, PN: 13225E7225) to the 5-foot hose.

g. Position the Pump Assembly, Diaphragm (NSN: 4320-01-440-7388, PN: 13229E7222) as close to the collection site as possible. Long hose runs on the discharge side reduce the pump's capacity.

NOTE: Prior to EVERY setup and use, the operator/maintainer is required to install a reducing coupling and a universal quick disconnect coupling half to the intake side of the pump (it has male threads). The discharge side of the pump has female threads and requires the installation of a 4-inch pipe nipple, a reducing coupling and a universal quick disconnect coupling half.

CAUTION
During installation of the pipe adapters, do not screw the pipe nipple more than 5/8 inch into the discharge port of the Pump Assembly, Diaphragm.

CAUTION
On the Pump Assembly, Diaphragm, be sure to remove the breather filler plug seal before operation. Using pliers to remove, pull the 1-inch long "spaghetti" shaped plastic from the hole drilled horizontally through the breather plug.

CAUTION

The Pump Assembly, Diaphragm should be located at the lowest practical elevation and as close to the evacuation site as possible.

CAUTION

If possible, avoid allowing debris to enter the system. The Pump and Hose Assemblies are capable of passing some solids, however, inducing solids into the system should be avoided.

h. Connect the Pump Assembly, Diaphragm to an approved power source. While the WDS MRI 164 is being flushed, turn on the pump. Observe the system to ensure that there are no leaks and that the pump is working on both intake (suction) and discharge sides. Check tightness of each connection by pouring about one gallon of water into the drain of each sink and funnel to ensure that there are no leaks and that the pump is working properly.

9-5. Operation

a. Monitor the hose assemblies for leaks in the fittings and in the hose.

b. Monitor the evacuation site for leaks and spills. This system is designed to provide collection of the wastewater for evacuation from the site. Coordinate with Preventive Medicine personnel within the Theater to periodically neutralize the collected wastewater and evacuate the material from the hospital site for further treatment or disposal.

c. Inspection of the pump.

On a daily basis.

(1) **Check the valves**. If the discharge valve does not seat properly, vacuum lift is lost. If the intake valve does not seal, pump efficiency will be lost.

(2) Check the diaphragm for leaks and wear.

(3) Grease the eccentric drive

daily with 4 to 6 strokes of a grease gun.

NOTE

FAILURE TO PERFORM DAILY PMCS (TO INCLUDE GREASE) WILL RESULT IN DECREASED LIFE TO THE PUMP UNIT.

CAUTION

Always keep the sink drains plugged when not actually draining water. Leaving them open will degrade the system and may burn out the Pump Assembly.

9-6. Disassembly

a. The procedures discussed enable you to disassemble the system in a manner that is both safe

and efficient. The procedure is intended to be independent of any actions associated with the disassembly of the hospital. However, hose lines located inside a TEMPER must be removed before the tent can be disassembled.

WARNING

Use of non-sterile disposable rubber gloves is recommended when handling wet components of the WWMS. Contact Preventive Medicine personnel for further guidance on this subject.

b. Prior to disassembly of the WWMS MRI 164, prepare at least 5-gallons of disinfectant solutions. The solution is made by mixing 16 ounces (approximately 2-cups) of household bleach (Sodium Hypochlorite, 0.525%) into 5-gallons of potable water. Use a 5-gallon "Jerry Can" for holding the disinfectant. The working solution is corrosive and will bleach items made of cloth and other liquid absorbing material. Take care not to spill the solution on clothing and boots.

c. Locate the sink or funnel at the most distant location of the medical facility. NOTE: there may be duplicate distant locations, so additional disinfectant should be prepared. With the system in normal operation, pour about one gallon of disinfectant into the plugged sink or funnel (closed ball valve). Allow the solution to sanitize the sink or funnel part for a minute, then remove the sink plug or open the ball valve. Allow the disinfectant solution to be drawn into the WWMS MRI 164 hoses and to the collection tank.

d. Use the disinfectant solution for **ALL sink and funnel locations**. More disinfectant solution may be necessary to properly sanitize those components.

e. Shut down the pump when the sound changes (to appear that it pumping air instead of liquid) to indicate that ALL disinfectant solution has passed through the system and is now in the collection tank.

NOTE

Allow the pump to remove as much of the disinfectant solution as possible before disassembly.

f. Begin disassembly of the WWMS MRI 164 at the point farthest from the collection tank or where TEMPER must be taken down.

NOTE

As wastewater hoses become disconnected, realize that some liquid may be trapped within the hose. Take action to place the lowest point of hoses where they can drain without leakage on TEMPER flooring or on tent material.

g. Disconnect the hoses from the sink or funnel, one at a time. Ensure that recently disconnected hose is raised high enough so that any liquid will drain out.

CAUTION
When removing hoses from a TEMPER, use caution to ensure that the fittings do not damage the tent flooring.

h. Do not replace the field sink drain hose assemblies. The new drain hose assemblies, installed as part of this system will remain with the field sinks. The old, unused drain hose assemblies may be stored with the equipment or handed to medical maintenance personnel.

i. Allow sufficient time for the hose assemblies and other components to dry out or otherwise reduce the liquid trapped in the hoses to manageable levels.

j. Separate the Wye fittings and the Hamilton Sink drain adapters for storage.

k. Collect all hose assemblies at the location of the Skip Box, Material Handling.

l. As much as possible, store similar fittings together.

m. Disconnect the pump from its power source and wind the cord around the handle. This will keep it from dragging when the pump is moved.

n. Remove the adapter fittings Installed on the suction and discharge chambers of the pump. Soak these components in the sanitizing solution for at least one minute.

NOTE
On disassembly of the pump, remove the inlet and outlet fittings to prevent breaking the suction or discharge chamber castings.

o. Tilt the pump so that its suction chamber is up and the discharge chamber is aimed towards the ground. Pour one gallon of the sanitizing solution into the suction chamber and allow it to run out the discharge chamber. Do not let the liquid enter the pump motor.

p. Secure or tie the fittings, removed in step *i.* to the pump handle. This will keep them from becoming lost during transport or storage.

q. Physically look over the work area to ensure that no fittings or hose assemblies have been overlooked.

Prior to moving the WWMS MRI 164, ensure that all components of the set are together. Use the inventory list to ensure that nothing is missing.

9-7. Preventive Maintenance. The following preventative checks and services should be done daily in addition to the operational checks detailed in paragraph 10-5, above. They should be done before storing or moving the system.

a. Pump. See separate chapter.

b. Hose Assemblies. Check hoses for abrasions, cuts, or gouges. Check for:

(1) The presence of bulges in the hose or seepage at the hose fittings during operations.

(2) Inspect for rust and deterioration on coupling halves and clamps.

c. Funnel Assembly. Cleaning the screen requires removing the funnel from the stand assembly prior to removal of the screen. If an attempt is made to remove the screen before removing the funnel from the stand assembly, the screen may tilt. This action may allow large solid material to be introduced into the WWMS MRI 164 and could clog hoses or damage the pump. Clean funnel assembly with sanitizing solution.

9-8. Repair Procedures. The WDS MRI 164 and the WWMS MRI 164 are supported by the Water Distribution and Wastewater (WDWWMS) MRI 164 Maintenance Set contains an initial stockage of repair parts and tools necessary to maintain the system. Both sets are fielded with the system. As parts are replaced or used in support of the WDS MRI 164 and WWMS MRI 164 the user is responsibility to replenish the components as needed.

a. Pump. See separate chapter.

b. Broken, Torn or Punctured Hoses. The principle behind repairing damaged hose is to make two good hoses from one damaged hose.

(1) Use a hacksaw to cut the hose squarely and remove the damaged section. If the short section is 2-feet or less, remove and retain the universal coupling if it is in useable condition.

Dispose of hose pieces shorter than 2-feet.

NOTE

Wash hacksaw blade in a dilute bleach solution or hot soapy water after each use to prevent contamination of the hacksaw blade.

(2) Place a hose clamp (from the maintenance set) over the newly cut end.

(3) Insert a Universal Quick Disconnect Coupling Half in the cut end as far as it will go.

(4) Position the hose clamp near the body of the coupling half.

(5) Tighten the clamp and trim the excess metal strip. Excess metal that is not trimmed must be flattened against the clamp with a hammer. If there are sharp edges, remove them with a small file.

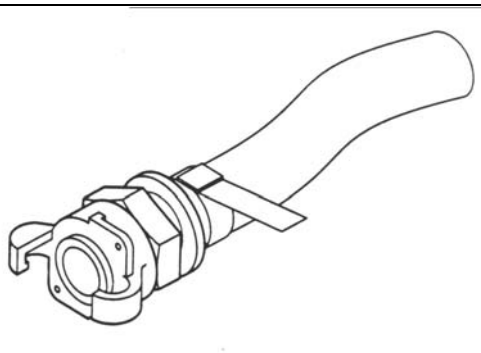

Figure 9-14
Hose Repair

NOTE

The cut ends of banding material are sharp enough to cause deep cuts and tear clothing. Use a file to dull or smooth the sharp edge. Use tape to cover the edge if necessary to prevent cuts during handling.

(6) Repeat steps (2) through (5) for the other piece of hose.

(7) Do not attempt to repair the Hose Assembly, Rubber (NSN: 6545-01-434-9627, PN: 13229E7226) hose if it breaks within 1 foot of the coupling assembly. Replace the entire assembly.

c. Universal Quick Disconnect, Coupling Half, Hose Fittings and Wye fittings. The only repair performed on these parts consists of replacement of the rubber gaskets. Cracked or broken fittings must be replaced.

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CHAPTER 10

Operator, Organizational, Direct Support, and General Support Maintenance Manual

Including

Repair Parts and Special Tools List

PUMP, CENTRIFUGAL: FRAME MOUNTED, 1½ IN. MIL-P-14515D, ELECTRIC MOTOR DRIVEN, (E.C. SCHLEYER PUMP CO. MODEL 4M-SE2000)

NSN 4320-01-01-5888

INTRODUCTION

10.1. Scope

This chapter is for your use in operating and maintaining the E.C. Schleyer Pump Co. Model 4M-SE2000 electric motor driven pump, which is a component of the older versions of the Water Distribution Set, MF2K. This chapter provides information relative to the operation, preventive maintenance and organizational maintenance of the equipment. It also provides information on the direct support and general support maintenance, repair instructions, and provides information on administrative storage.

10.2. Maintenance Forms and Records

Maintenance forms and records that you are required to use are explained in TM 38-750.

10.3. Equipment Serviceability Criteria (ESC)

This equipment is not covered by an ESC.

10.4. Description

a. General. The electric motor driven pump (figure 10-1) is a portable, frame-mounted unit designed to pump water at the rate of 65 gpm (gallons per minute) at 50 ft-tdh (feet-total dynamic head).

b. The pumps is equipped with a Baldor Electric Co. motor, model 617M. The motor is a 2 hp (horsepower) unit encased in a heavy-duty housing. It is a totally enclosed fan cooled motor provided with permanently lubricated bearings, and watertight terminal box.

c. If you need a detailed description of any component of the electrical motor drive pump, refer to the applicable organizational maintenance information.

10.5. Identification and Tabulated Data

The E.C. Schleyer pump, Model 4M-SE2000, has three identification plates. The information on these plates follows:

a. Identification Plate.

Manufacturer	E.C. Schleyer Pump Co, Inc.
Model	4M-SE2000
Serial	R113 (through R523)
Nomenclature	Pump, centrifugal, self-priming, frame mounted, 1½ in.
Capacity	65 gpm
NSN	4320-01-010-5888
Drive	EMD (Electric motor driven)
Contract	DSA700-75-C-8357
Code Ident	97403

b. Pump Manufacturers Identification Plate.

Nomenclature	Pump, centrifugal, 1½ in., frame mtd. EMD, fresh water, 65 gpm, 50ft. head
Model	4M-SE2000
Contract	DSA 700-75-C-8357
Serial	R113 (through R523)
Capacity	Blank
Registration No	Blank
GVW	Blank
Length	21 in. (53.3 centimeters)
NSN	4320-01-010-5888
Date Mfd.	As applicable
Height	22 in. (55.8 centimeters)
Eng Sr	Blank
Ship Wt	110 lb. (49.5 kilograms)
Width	13 in. (33 centimeters)
Warranty	Blank
Month	Blank
Miles	Blank
Cube	4 cu ft (0.112 cubic meters)
Date shipped	As applicable
Date Insp.	As applicable
Mfd by	E.C. Schleyer Pump Co., Inc., Anderson, Indiana
Insp. Stamp	As applicable

c. Motor Manufacturers Identification Plate.

Manufacturer	Baldor Electric Company
Model	617M
Type	Induction
Phase	3
Volts	205
Amperes	5.7
Hertz	60
Horsepower	2
Revolutions per Minute	3,450
Enclosure	TEFC
Duty	Continuous

SHIPPING DIMENSIONS

LENGTH 21 INCHES (53.3 CENTIMETERS)
WIDTH 13 INCHES (33 CENTIMETERS)
HEIGHT 22 INCHES (55.8 CENTIMETERS)
WEIGHT 110 POUNDS (49.5 KILOGRAMS)

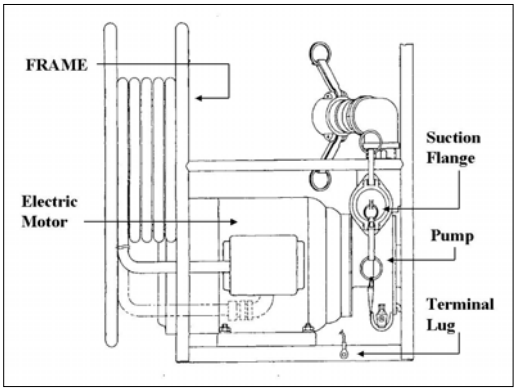


Figure 10-1. Electric motor driven pump (front view)

OPERATING INSTRUCTIONS

WARNING
If equipment fails to operate, refer to troubleshooting procedures in the Operator and Crew Maintenance Instructions

10.6. Operation of Centrifugal Pump

a. The instructions in this section is published for the information and guidance of the personnel responsible for the operation of the pumping units.

b. The operator must know how to perform every operation of which the pumps units are capable. This section gives instructions on starting and stopping the pump units, operation of the pump units, and on coordinating the basic motions to perform the specific tasks for which the equipment was designed. Since every job presents a different problem, the operator must have to vary given procedures to fit the individual job.

10.7. Starting

a. Preparation for starting.

(1) Refer to paragraph 6.18 and table 6.1 to perform the daily preventive services.

(2) Reference to figure 6-2 and prime the pumping unit.

CAUTION

Never operate the pump until the body has been filled with water. Operating the pump dry will destroy the seal. When not in use, make sure the body is drained.

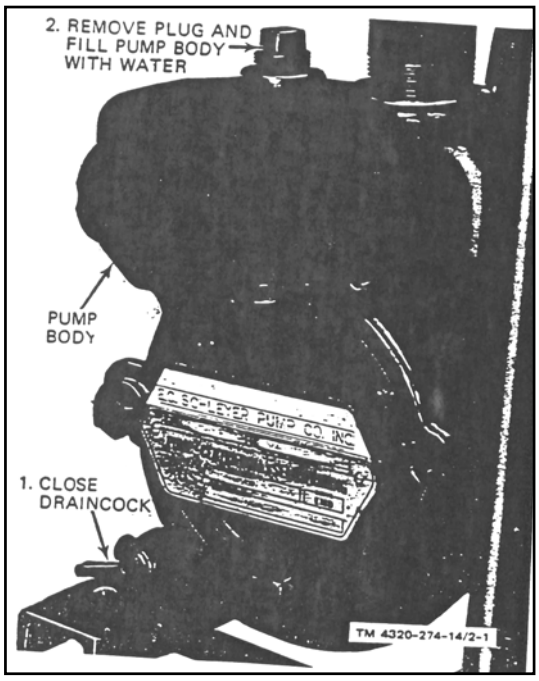


Figure 10-2

b. Starting Instructions. To start the electric motor powered pump connect the power cable to a 3 phase, 208-volt, 60 hertz power source.

10.8. Stopping.

Disconnect the power cable from the source of power.

10.9. Operation of Equipment.

The operation of the pump is largely automatic. The operator should maintain constant watch for overheating, failure to perform to rated efficiency, and vibration. Proper care and maintenance will insure efficient operation.

OPERATION UNDER UNUSUAL CONDITIONS

10.10. Operation in Extreme Cold.

a. Keep the unit free of snow and ice. Cover the unit when not in use. Provide a suitable shelter for the unit during outside operation.

b. To avoid freezing, drain the pump after operation.

c. In extreme cold it may be necessary to preheat the pump body; apply heat cautiously and sparingly.

CAUTION
Do not overheat the pump body.

10.11. Operation in Extreme Heat.

a. Protect the unit from the direct rays of the sun.

b. Maintain adequate space around the unit to provide heat dissipation. If operating in an enclosure, provide a fan to circulate air when possible.

c. Keep the unit clean to provide proper heat transfer to the air.

10.12. Operation in Dusty or Sandy Areas.

Shield the unit from dust. Take advantage of natural barriers which offer protection from blowing sand and/or dust, or erect a suitable shield if necessary.

10.13. Operation Under Rainy or Humid Conditions.

a. Cover the unit with a waterproof cover when outside and inoperative. During operation, take advantage of natural barriers which offer protection from storms, or erect a suitable shelter to protect the unit.

b. Keep electrical cables, wires, and parts free of moisture and clean.

10.14. Operations in Salt Water Areas.

a. Salt water caused corrosive action on metal. Exercise care to keep the unit from contact with salt water. Wash the unit frequently with fresh water.

b. Paint all exposed non -polished metal surfaces with standard issue rust preventative, if available, or cover with a light coating of grease.

c. Flush the pump if salt water has entered the pump body. Flush if there has been a possibility of salt water contamination.

10.15. General.

The electric motor powered pumps require no periodic lubrication.

10.16. Detailed Lubrication Information.

The electric motor powered pumps have been pre-lubricated at the factory and require no specific lubrication. It may be necessary to use fine oil around the bearings supporting the shaft in certain areas of operation. The operator should maintain a constant watch for lubrication failures.

10.17. Preventive Maintenance Checks and Services (PMCS) – General.

To insure that the pumping units are ready for operation at all times, they must be systematically inspected so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services (PMCS) to be performed are listed in paragraph 10.18 and table 10.1. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop the unit immediately if a deficiency is discovered during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest opportunity.

10.18. Preventative Maintenance Checks and Services (PMCS).

Refer to Table 10.1 for the applicable PMCS.

Table 10.1. Preventative Maintenance Checks and Services (PMCS)

B – Before Operation D – During Operation
A – After Operation W – Weekly

Interval and Sequence No.	Item to be Inspected Procedure
B D A W	
1	ELECTRICAL LINES AND CONNECTIONS Inspect lines for breaks and frayed insulation. Check for loose connections.
2	DRAINCOCK Check for leaks, improper operation, and other damage.
3	ELECTRIC MOTOR FAN GUARD Inspect for dirt, foreign matter and damage. The openings of the fan guard shall be clean and free of foreign matter and shall show no damage.
4	ELECTIC MOTOR Check to see that the motor is securely mounted. The exterior surface of the motor should be clean, free of dust, dirt, grease and fungus. All connections and terminals shall be secure.
5	PUMP BODY Inspect for cracks, leaks, or other damage. The exterior surface should be clean, free of dust, dirt, grease, and fungus.
6	PUMP UNIT Inspect the entire unit for operational damage.
7	PUMP UNIT Clean the pump unit with clear water, rinse, and wipe dry.
8	SUCTION VALVE Check the suction valve for proper operation and leaks.

TROUBLE SHOOTING

10.19. General

a. This section contains troubleshooting information for locating and correcting most of the operating troubles that may develop in the electrical motor driven pump. Each malfunctions for an individual component, unit, or system is followed by a list of tests or inspections that will help you to determine probable causes and corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or it not corrected by listed corrective actions, notify your supervisor.

NOTE

Before you use this table, be sure you have performed all applicable operating checks.

Table 10.2. Troubleshooting

Malfunction
Test or Inspection
Corrective Action

ELECTRIC MOTOR

1. ELECTRIC MOTOR FAILS TO FUNCTION PROPERLY

Check for loose or corroded wiring connections
Clean corroded connections. Tighten loose connections at electric motor and ground

2. ELECTRIC MOTOR OVERHEATS

Step 1: Check power source voltage.
If the power source is too low, too high, or unbalanced, connect the electric motor to a proper power source.
Step 2. Check motor for binding.
If the motor has restrictive rotation, notify organizational maintenance.

PUMP

3. PUMP FAILS TO FUNCTION PROPERLY

Check to see if air is entering pump body through loose connections.
Tighten loose connections and be certain hoses have no leaks.

Table 10.2. Troubleshooting (continued)

Malfunction
Test or Inspection
Corrective Action

4. PUMP LEAKS DURING OPERATION

Inspect for any visible leakage near seal or suction valve.
Notify organizational maintenance, when leakage occurs.

5. NO WATER OR INSUFFICIENT WATER OUTLET PRESSURE

Step 1. Ascertain if pump is primed.
Prime pump.
Step 2. Inspect suction line for clogging.
Remove the suction line, clean clogged area and replace on unit.

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

SERVICE UPON RECEIPT OF EQUIPMENT

10.20. Inspecting and Servicing Equipment

a. Inspection

(1) Make a complete visual inspection of the unit to assure that all accessories, attachments, publications and required tools have been delivered with the pumping assembly.

(2) Inspect the unit for loss of parts or hardware.

(3) Rotate the pump by hand prior to starting the unit; this will assure freedom of action of components.

(4) If used equipment is being inspected, pay particular attention to all inspection procedures.

b. Servicing Equipment

(1) Equipment is shipped complete and ready for operation.

(2) Perform the daily preventative maintenance checks and services (paragraph 10.18).

10.21. Installation of Separately Packed Components.

The pumps are packed as a single unit and therefore require no specific instructions for the installation of separately packed components.

10.22. Installation and Setting Up Instructions.

a. Set the unit on a base of sufficient strength to support its weight and as level as possible and not more than 25 feet above liquid.

b. Connect suitable hose lines to the suction and discharge flange adapters.

c. Connect the electric leads to the power cable as shown in figure 10.3.

NOTE

The cable has four color-coded conductors. The green conductor has an oversize lug at one end and is connected to the large pin of the plug connector. It is used to connect the frame of the electric motor to the power source ground system.

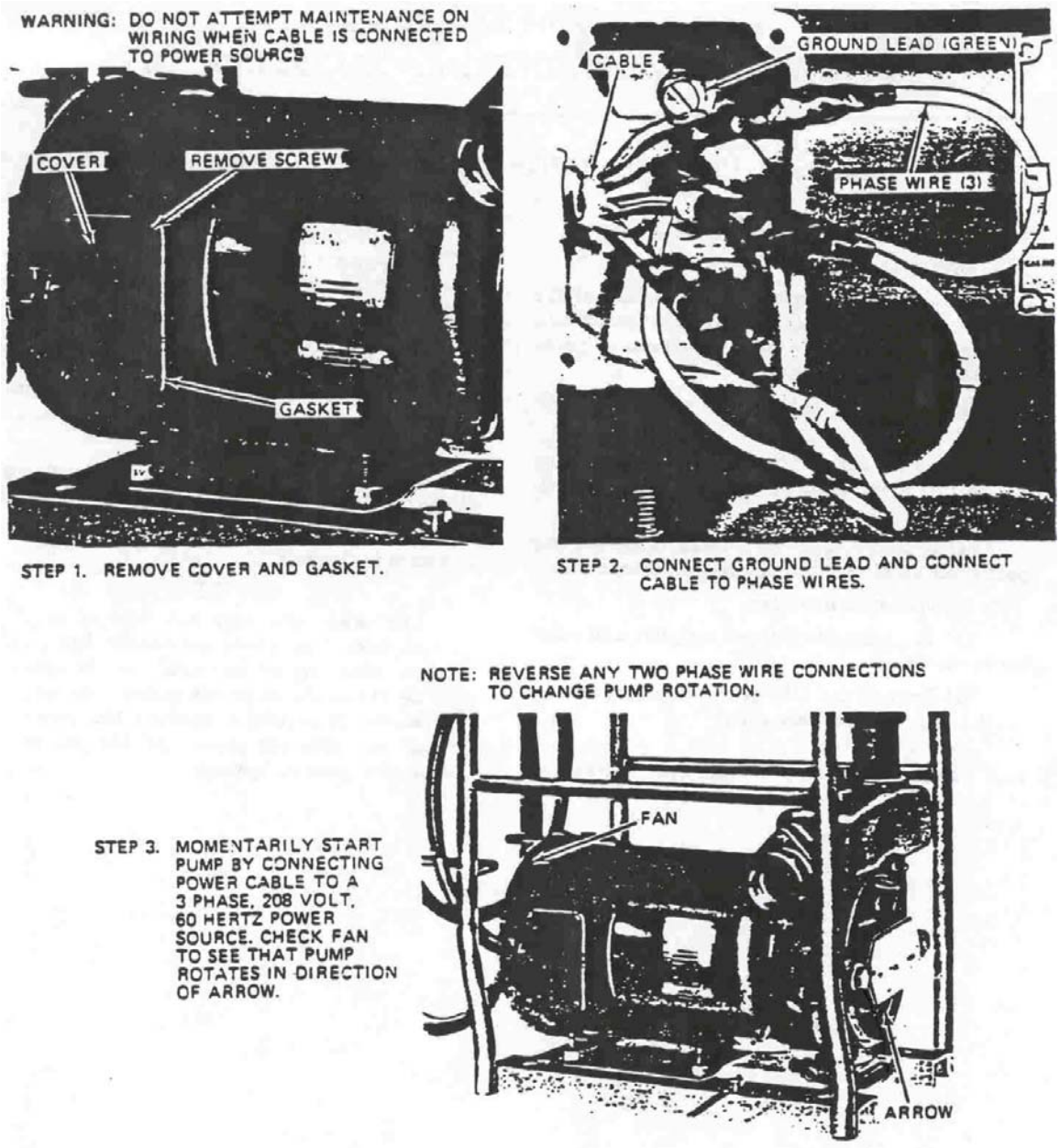

WARNING: DO NOT ATTEMPT MAINTENANCE ON WIRING WHEN CABLE IS CONNECTED TO POWER SOURCE
COVER
REMOVE SCREW
GASKET
STEP 1. REMOVE COVER AND GASKET.
CABLE
GROUND LEAD (GREEN)
PHASE WIRE (3)
STEP 2. CONNECT GROUND LEAD AND CONNECT CABLE TO PHASE WIRES.
NOTE: REVERSE ANY TWO PHASE WIRE CONNECTIONS TO CHANGE PUMP ROTATION.
STEP 3. MOMENTARILY START PUMP BY CONNECTING POWER CABLE TO A 3 PHASE, 208 VOLT, 60 HERTZ POWER SOURCE. CHECK FAN TO SEE THAT PUMP ROTATES IN DIRECTION OF ARROW.
FAN
ARROW

Figure 10.3

d. If the large pin socket of the power source receptacle is not connected to the power source ground system, install a ground lead not smaller than No. AWG 6 copper wire.

e. Connect the other end of the ground lead to the closest ground system, and underground metallic water piping system or the steel frame of a building.

MOVEMENT TO A NEW WORKSITE

10.23. Dismantling for Movement.

a. Disconnect the hose lines from the flange adapters.

b. Cover the suction and discharge flange adapters to protect the threads and prevent foreign materiel from entering the pump.

c. Disconnect the ground lead from the terminal lug.

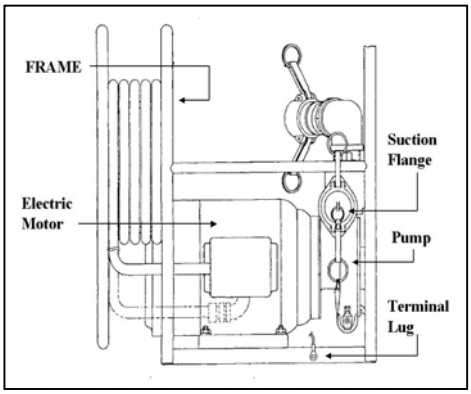


Figure 10-4

10.24. Reinstallation After Movement.

Refer to paragraph 10.22 and reinstall the pump unit.

REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

10.25. Tools and Equipment.

a. Basic tools and repair parts issued with, or authorized for the pumping unit are listed later in this chapter.

b. Organizational personnel for maintenance of the pumping unit require no special tools or equipment.

10.26. Organizational Maintenance Repair Parts.

Repair parts and equipment are listed and illustrated in the repair parts and special tools list covering organizational maintenance for this equipment later in this chapter.

LUBRICATION INSTRUCTIONS

10.27. The electric motor powered pump has been pre-lubricated at the factory and requires no specific lubrication.

PREVENTATIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

10.28. General.

To insure that the pumping units are ready for operations at all times, they must be systematically inspected so that defects may be discovered and corrected before they result in serious damage or failure. The necessary PMCS to be performed are listed in paragraph 10.29. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

10.29. Preventative Maintenance Checks and Services.

Refer to table 10.3 for the applicable PMCS.

Table 10.3. Preventative Maintenance Checks and Services (PMCS)

M – Monthly Q- Quarterly

Interval Sequence No. M	Q	Item to be Inspected Procedure
1	10	APPEARANCE OF EQUIPMENT Clean entire unit with clear water, rinse, and dry.
2	11	ELECTRICAL LINES AND CONNECTIONS Inspect lines for breaks and frayed insulation. Check for loose connections.
3	12	DRAINCOCK Check for leaks, improper operation, or other damage.
4	13	ELECTRIC MOTOR FAN GUARD Inspect for dirt, foreign matter and damage. The openings of the fan guard shall be clean and free of foreign matter and shall show no damage.
5	14	ELECTRIC MOTOR Check to see that the motor is securely mounted. The exterior surface of the motor should be clean, free of dust, dirt, grease, and fungus. All connections and terminals shall be secure.
6	15	HARDWARE

Check that all hardware is secure and tight.

Table 10.3. Preventative Maintenance Checks and Services (PMCS) (continued)

M – Monthly Q- Quarterly

Interval Sequence No. M	Q	Item to be Inspected Procedure
7	16	PUMP BODY Inspect for cracks, leaks, or other damage. The exterior surface should be clean, free of dust, dirt, grease, and fungus.
8	17	PUMP UNIT Inspect the entire unit for operational damage. Check each component for wear or damage.
9	18	SUCTION VALVE Check the suction valve for proper operation and leaks.

TROUBLESHOOTING

10.30.General.

This section provides information useful in diagnosing and correcting unsatisfactory performance or failure of the pumping units and components.

10.31. Troubleshooting.

Refer to table 10.4 for trouble shooting procedures.

Table 10.4. Troubleshooting

Malfunction
Test or Inspection
Corrective Action

ELECTRIC MOTOR

1. ELECTRIC MOTOR FAILS TO FUNCTION PROPERLY.

Step 1. Check for loose or corroded wiring connections.

Tighten loose connects at electric motor and ground. Clean corroded connections.

Table 10.4. Troubleshooting (continued)

Malfunction
Test or Inspection
Corrective Action

ELECTRIC MOTOR (continued)

1. ELECTRIC MOTOR FAILS TO FUNCTION PROPERLY.

Step 2. Check for correct connection of phase wires.
Reverse phase wires in accordance with paragraph 4-3.
Step 3. Check for defective motor.
If phase wires, ground and power source are wired correctly but the motor does not function properly, replace the motor.

2. ELECTRIC MOTOR OVERHEATS.

Step 1. Check power source voltage.
If the power source is too low, too high, or unbalanced, connect the electric motor to a proper power source.
Step 2. Check motor for binding.
If the motor has any restrictive rotation, replace the motor.

PUMP

3. PUMP FAILS TO FUNCTION PROPERLY.

Check to see if air is entering the pump body through loose connections.
Tighten loose connections and be certain hoses have no leaks.

4. PUMP LEAKS DURING OPERATION.

Inspect for any visible leakage near seals or suction valve.
Any evidence of leakage, notify general support.

5. NO WATER OR INSUFFICIENT WATER OUTLET PRESSURE.

Step 1. Ascertain if pump is primed.
Prime pump.
Step 2. Inspect suction line for clogging.
Remove the suction line, clean clogged area and replace on unit.
Step 3. Excessive suction lift.
Locate pump closer to liquid.
Step 4. Air leaks on suction side of pump.

	Correct air leaks.

MAINTENANCE OF PUMP

10.32. Centrifugal Pump Assembly.

a. The centrifugal pump is driven by the electric motor. The pump is designed to pump water at the rate of 65 GPM (gallons per minute) at 50 ft-tdh (feet-total dynamic head).

b. Removal.

(1) Remove the cover plate shoulder bolts. Remove cover plate from the pump body.

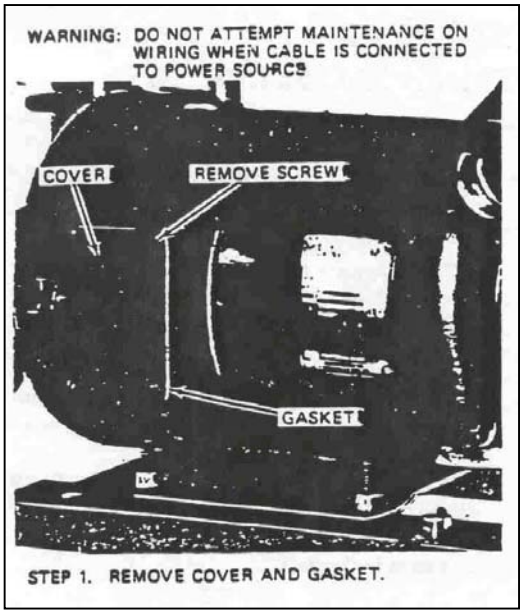

WARNING: DO NOT ATTEMPT MAINTENANCE ON WIRING WHEN CABLE IS CONNECTED TO POWER SOURCE
COVER
REMOVE SCREW
GASKET
STEP 1. REMOVE COVER AND GASKET.

Figure 10.5
Step 1 – Remove Cover Plate and Pre-Formed Packing

NOTE REMOVE KEY FROM ENGINE SHAFT

(2) Remove impeller cap screw and remove impeller and key from the shaft adapter.

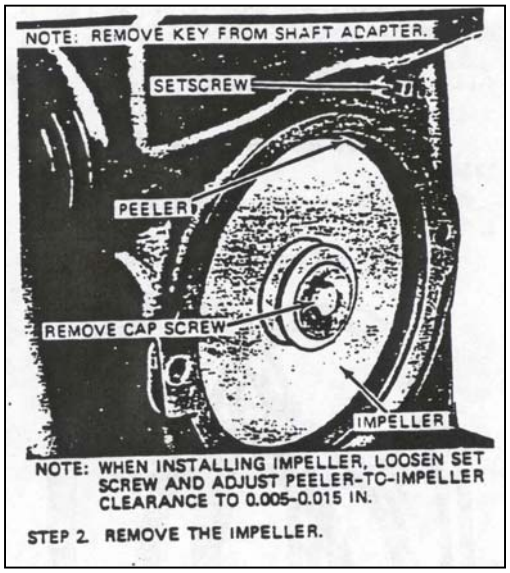

NOTE: REMOVE KEY FROM SHAFT ADAPTER.
SETSCREW
PEELER
REMOVE CAP SCREW
IMPELLER
NOTE: WHEN INSTALLING IMPELLER, LOOSEN SET SCREW AND ADJUST PEELER-TO-IMPELLER CLEARANCE TO 0.005-0.015 IN.
STEP 2. REMOVE THE IMPELLER.

Figure 10.6
Step 2 – Remove the Impeller

NOTE: WHEN INSTALLING IMPELER, LOOSEN SET SCREW AND ADJUST PELLER-TO-IMPELLER CLEARANCE TO 0.005-0.015 INCH

(3) Remove wear-plate-retaining screws and remove wear-plate. Remove shims, shaft adapter, and one-half of the seal assembly. Remove key from motor shaft.

NOTE: REMOVE KEY FROM ENGINE SHAFT.
SEAL ASSEMBLY
WEAR PLATE
SHIM
SHAFT ADAPTER
REMOVE SCREW (3)
NOTE: MAINTAIN IMPELLER-TO-WEAR PLATE CLEARANCE AT 0.010-0.015 IN. BY USING SHIMS AS REQUIRED.
STEP 3. REMOVE WEAR PLATE, SHIMS, SHAFT ADAPTER, AND ½ OF SEAL ASSEMBLY.

Figure 10.7
Step 3 – Remove Wear Plate, Shims, Shaft Adapter and ½ of Seal Assembly

NOTE: MAINTAIN IMPELLER-TO-WEAR PLATE CLEARANCE OF 0.010-0.015 INCH BY USING SHIMS AS REQUIRED

(4) Remove pump mounting bolts and separate pump from motor.

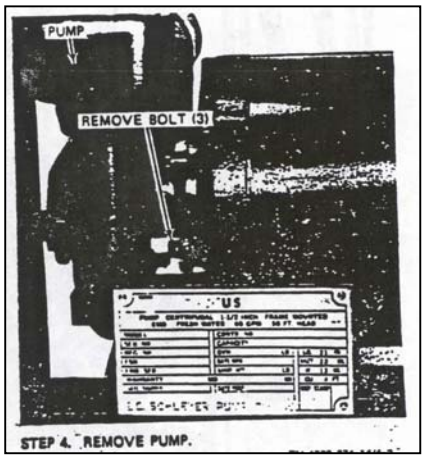


Figure 10.8
Step 4 – Remove Pump

10.33 Electric Motor Assembly.

a. Removal.

(1) Remove the centrifugal pump (paragraph 10.32.b).

(2) Remove the power cable as shown in figure 10.3.

(3) Refer to figure 10.6 and remove the four nuts and cap screws securing the motor to the frame.

b. Installation.

(1) Position the motor on the frame and secure with four cap screws and nuts.

(2) Install the power cable as shown in figure 10.3.

(3) Install the centrifugal pump per instructions in paragraph 10.32.

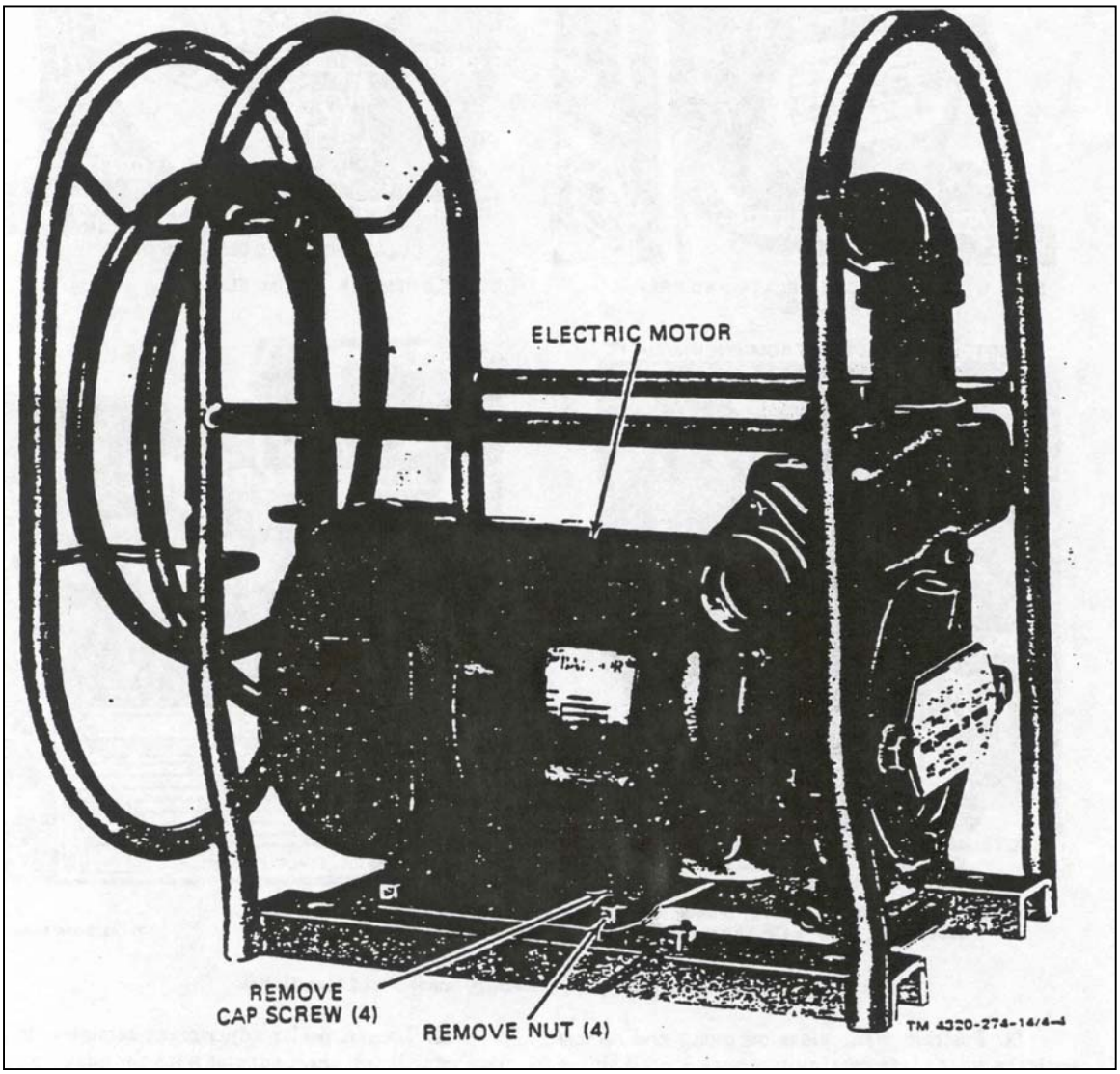


Figure 10.8. Electric motor assembly, removal and installation.

10.34. Frame.

a. General. The frame is of welded steel construction and designed to permit easy handling.

b. Remove.

(1) Remove the electric motor assembly (paragraph 10.33.a).

(2) With the pump and motor removed, the frame is free of components.

c. Installation. Install the motor and pump (paragraph 10.33.b).

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

10-35 Special Tools and Equipment

No special tools or equipment are required by direct support or general support to maintain the pump unit.

10-**36 Maintenance Repair Parts**

Repair parts and equipment are listed and illustrated in the repair parts and special tools list covering direct support and general support maintenance for this equipment.

TROUBLESHOOTING

10.37.General

This section provides information useful in diagnosing and correcting unsatisfactory performance or failure of the pumping assembly or any of its components. Malfunctions which may occur are listed in Table 10.5.

10.38.Troubleshooting

Refer to table 10.5 for troubleshooting data.

Table 10.5. Troubleshooting

Malfunction
Test or Inspection
Corrective Action

PUMP

1. PUMP FAILS TO FUNCTION PROPERLY.

Step 1. Inspect impeller for damage or wear.
If damage or wear is apparent, replace impeller.
Step 2. Inspect adapter shaft and keys for damage.
If damage is apparent, replace damaged parts.
Step 3. Inspect the wear plate for worn areas.
If wear is obvious, replace the wear plate.
Step 4. Check peeler for proper clearance.
Adjust peeler (paragraph 10-5).
Step 5. Check clearance of impeller-to-wear plate.
Adjust impeller-to-wear plate (paragraph 10-5).

Table 10.5. Troubleshooting (continued)

Malfunction
Test or Inspection
Corrective Action

2. PUMP OPERATES WITH EXCESSIVE NOISE.

Step 1. Inspect for loose, broken or damaged impeller.
Tighten loose impeller; replace damaged impeller.
Step 2. Inspect for defective seal.
If defect is obvious, replace seal.
Step 3. Check peeler for proper clearance.
Adjust peeler (paragraph 10-5).

3. PUMP LEAKS

Step 1. Inspect check valve gasket for damage.
Replace damaged check valve gasket.
Step 2. Inspect seal for damage.
If damaged, replace seal.
Step 3. Inspect suction valve for damage.
If damaged, replace.

4. PUMP WILL NOT OPERATE

Step 1. Check main power source for defective fuse and/or circuit breaker.
Replace fuse and/or reset circuit breaker.
Step 2. Inspect for frozen or damaged impeller.
Loosen or replace the impeller and inspect for proper clearance.

ELECTRIC MOTOR

1. ELECTRIC MOTOR OVERHEATS

Step 1. Inspect for defective bearings.
Replace defective bearings (paragraph 10-11).
Step 2. Inspect and test for faulty stator windings.
Replace defective stator (paragraph 10-11).

2. ELECTRIC MOTOR VIBRATES

Step 1. Inspect for defective or broken fan.
If defects are apparent, replace fan (paragraph 10-11).
Step 2. Inspect for defective bearings.
Replace defective bearings (paragraph 10-11).
Step 3. Inspect for warped rotor shaft.
If warped, replace rotor (paragraph 10-11).

Table10.5. Troubleshooting (continued)

Malfunction Test or Inspection Corrective Action
3. ELECTRIC MOTOR FAILS TO START
Step 1. Check for defective bearings. If defective, replace bearings (paragraph 10-11). *Step 2.* Inspect and test for faulty stator windings. Replace defective stator (paragraph 10-11). *Step 3.* Inspect for defective rotor. If defective, replace rotor (paragraph 10-11).
4. POWER LEAKAGE IN ELECTRIC MOTOR.
Step 1. Inspect for defective bearings. Replace bearings (paragraph 10-11). *Step 2.* Inspect and test rotor and stator. If defective, replace rotor and stator (paragraph 10-11).

GENERAL MAINTENANCE

10.39. Electric Motor Testing.

WARNING
Do not attempt maintenance on the motor when electrical cable is connected to the power source.

a. Preparation. Disconnect the power cable shown in figure 10.3.

b. Testing.

(1) Using a suitable test circuit, test for continuity between each of the motor phase wires. Replace the motor if the lamp does not light. Test for grounds between one motor phase (any one) wire and the frame. If the lamp is lit, replace the motor.

(2) Use a megohmmeter and measure the insulation resistance of the stator assembly as instructed in TM 5-764 (Electric Motor and Generator Repair). The insulation resistance should not be less than 0.25 megohms.

(3) Connect the electric motor leads to a balanced voltage source of 3-phase, 60-hertz, 208-volt power. Operate the motor under its normal load and measure the amperage in each motor lead with a hook-type ammeter. The amperage in the three leads should be equal and not more than 6-3 amperes per lead. Measure the shaft speed with a tachometer. The speed should not be less than 3,450 rpm (revolutions per minute).

REPAIR INSTRUCTIONS

CENTRIFUGAL PUMP ASSEMBLY

10.40. Pump Removal.

a. Refer to figure 10-3 and remove the cover plate shoulder bolts. Remove cover plate from the pump body.

b. Remove impeller cap screw and washer; remove impeller and key from the shaft adapter.

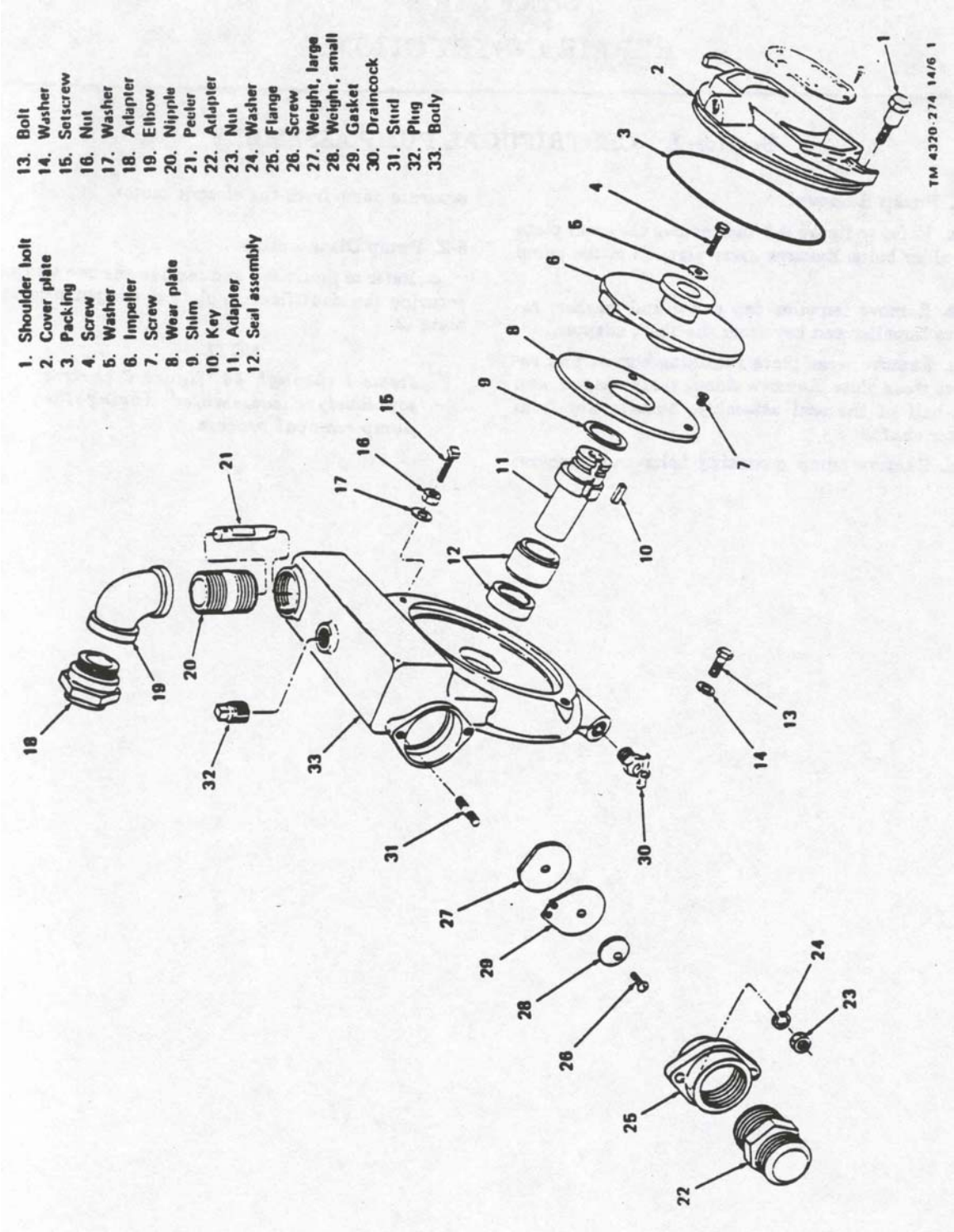
c. Remove wear plate retaining screws and remove wear plate. Remove shims, shaft adapter, and one-half of the seal assembly. Remove key from motor shaft.

d. Remove pump mounting bolts and washers; separate pump from the electric motor.

10.41. Pump Disassembly.

a. Refer to figure 10.9 and remove the two screws securing the identification plate to the pump cover plate (2).

NOTE
Items 1 through 14 (figure 6.9) were previously disassembled during the pump removal process.



(Figure 10.9. Centrifugal pump assembly, disassembly and re-assembly.

b. Remove setscrew (15), nut (16), and washer (17) from the pump body.

c. Remove adapter (18); elbow (19), nipple (20), and peeler (21) from the pump body.

d. Remove adapter (22) from the flange (25). Remove two nuts (23) and washers (24), and separate flange (25) from the pump body.

e. Remove screw (26) and separate weights (27 and 28) from the check valve gasket (29).

CAUTION
Do not pry with a sharp instrument as gasket may be damaged.

f. Remove draincock (39), studs (31), and plug (32) from the pump body (33).

10.42. Pump Cleaning and Inspection.

a. Clean pump body with pressurized water, spraying interior and exterior. Allow to dry thoroughly.

WARNING
Dry cleaning solvent, Specification P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. (38°C.).

b. Clean pump connections thoroughly. Use dry cleaning solvent, Specification P-D-680, on metal parts. Dry components thoroughly.

c. Inspect all parts for cracks, excessive wear, damage, or deterioration. Replace defective parts.

10.43. Pump Reassembly.

a. Refer to figure 10.5 and install plug (32), studs (31) and draincock (30) on the pump body (33).

b. Position gasket (29) so that hinge end is up. Make sure that large weight (27) is on the pump side of the gasket. With small weight (28) positioned on the opposite side of the gasket, install the check valve gasket with screw (26).

c. Install flange (25) on pump body and secure with washers (24) and nuts (23). Install adapter (22) on the flange.

d. Install peeler (21), nipple (20), elbow (19) and adapter (18) on the pump body.

e. Position identification plate on the pump cover plate (2) and secure with screws. The remaining components will be assembled when the pump is installed.

10.44. Pump Installation.

a. Refer to figure 10.3 and position the pump body on the electric motor. Secure with the three pump mounting bolts and washers. Install remaining half of the seal assembly, and the shaft adapter, on the motor shaft using the motor shaft key.

b. Position wear plate on pump and secure with the wear plate retaining screws. Install shims as required to maintain wear plate-to-impeller clearance of 0.010 to 0.015 inch.

c. Loosen peeler adjustment setscrew. Position impeller on shaft adapter with adapter key. Adjust setscrew to obtain peeler-to-impeller clearance of 0.005 to 0.015 inches. Secure impeller cap screw and washer.

c. Position cover plate on pump body and secure with the cover plate shoulder bolts.

10.45. Pump Test

a. Install the unit in accordance with paragraph 10-3 being certain that the suction and discharge hoses and fittings are the same nominal size as the suction and discharge ports of the pump.

b. Under the above conditions the pump shall perform as follows:

(1) Prime in not more than 133 seconds.

(2) Deliver not less than 58.5 gpm at a total head of 45 feet.

(3) Deliver not less than 45 gpm at a total head of 63 feet.

ELECTRIC MOTOR ASSEMBLY

10.46. Motor Removal

a. Remove the centrifugal pump (paragraph 10.1).

b. Disconnect the motor power cable shown in figure 10.3.

c.Refer to figure 10.6 and remove the four nuts, washers, and screws securing the motor to the frame.

d. Refer to figure 10.10 and remove screws (1), conduit box (2), and gasket (3) from the conduit box.

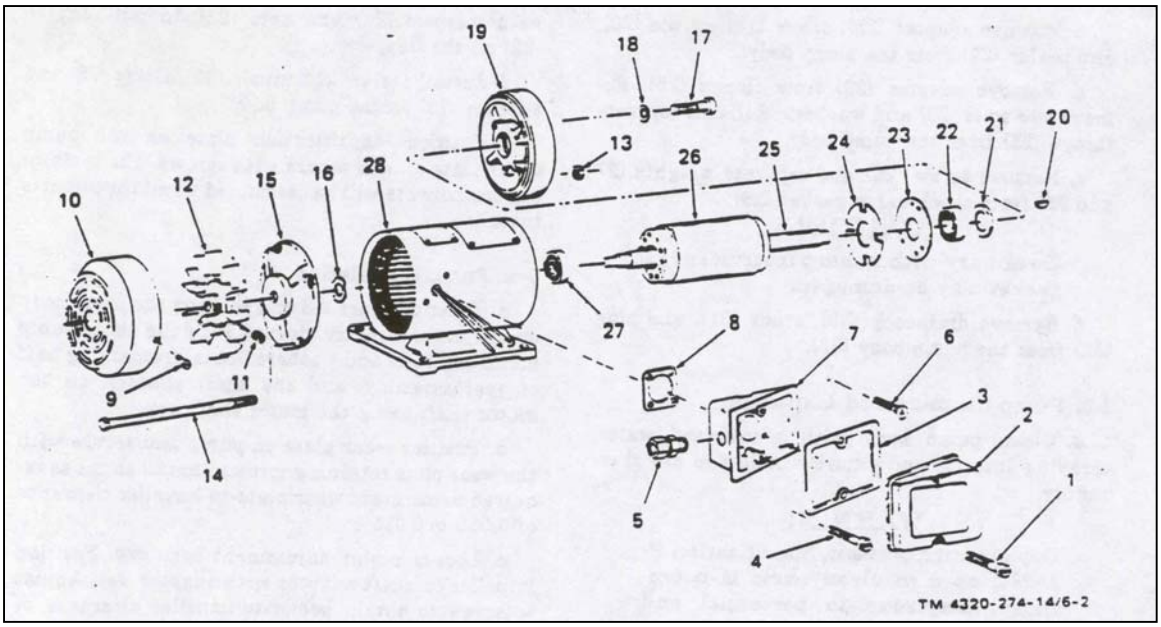


Figure 10.,10. Electric motor, disassembly and reassembly.

e. Remove gland screw (4) and cable gland (5) from the conduit box. Remove screws (6), conduit box (7), and the conduit box gasket (8) from the motor housing.

f. Remove screw (9) and fan guard (19) from the motor shaft.

g. Remove nuts (13), bolts (14), and end shield (15) from the motor housing. Remove spring washer (16) from the end shield.

h. Remove bolts (17), washers (18), and end shield (19) from the motor housing. Remove key (20), shaft sleeve (21), bearing (22), bearing retainer (23), and internal fan (24) from the shaft. Remove bearing (27) from the opposite end of the shaft.

10.47. Motor Cleaning, Inspection, and Testing

WARNING

Dry cleaning solvent, Specification P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. (38°C.).

a. Clean all parts using dry cleaning solvent, Specification P-D-680, and dry thoroughly.

b. Inspect all parts for cracks, excessive wear, damage, or deterioration.

c. Use an inside growler and test the stator assembly for shorted coils as instructed in TM 5-764 (Electric Motor and Generator Repair). Place the rotor assembly on an external growler and test for open circuits (see TM 5-864).

d. Replace all damaged or defective parts.

10.48. **Motor Rewind Data**

The following rewind data is furnished in the event it is necessary to rewind the stator.

a. Stator

Number of poles ……....2
Number of coils ……..36
Number of slots …..…….…….. ..36
Turns per coil ……..…….13 turns of (2) No. 19 AWG conductors in parallel
Coil span ..……..….1-14
Wire Size .……..……No 19 AWG
Type of wire .Type T, heavy Polythermalex, coated round copper magnet wire per MIL-W-583A

b. Insulation materials:

(1) Slot cell .. 5-5-5 DMD-100 (36 pcs.)
(2) Slot phase separator ….. 3-3-3- DMD-100 (36 pcs.)
(3) Slot wedge … 5-5-5 DMD-100 (36 pcs.)
(4) Phase group separator … 0.007 Polyester glass sheet (12 pcs.)
(5) Dipping compound … Type AN, grade CB, clear baking varnish, per MIL-V-1137A, P.D. George No. 2106, Class F.

c.Dipping and baking procedure:

(1) Preheat to 225°F (107°C)
(2) Dip in baking varnish until bubbling ceases.
(3) Bake at 240°F (116°C) for four hours.
(4) Redip in baking varnish until bubbling ceases.
(5) Bake at 240°F (116°C) for eight hours.
(6) Spray with air dry varnish and air dry.

10.49. Motor Reassembly.

a. Install rotor assembly (26), figure 6-2) on shaft (25). Install bearing (27), internal fan (24), bearing retainer (23), bearing (22), shaft sleeve (21), and key (20) on shaft.

b. Slide assembled rotor shaft through end shield (19) and install bolts (17) and washers (18). Install opposite end of rotor shaft through stator and install spring washer (16). Install end shield (15), bolts (14), and nuts (13).

c. Position fan (12) on rotor shaft and install setscrew (11). Install fan guard (19) on motor housing and fasten with screw (9).

d. Position conduit box gasket (8) and conduit box (7) on the motor housing and install the retaining screws (6). Install cable gland (5) and gland screw (4) on the conduit box. Install gasket (3), conduit box cover (2), and screws (1).

10.50.Motor Installation

a. Refer to figure 10.6 and

position the motor on the frame. Install the four screws, washers, and nuts.

b. Connect the electrical power cable per instructions contained in figure 10.3.

c. Install the centrifugal pump (paragraph 10.45).

ADMINISTRATIVE STORAGE

10.51. Preparation of Equipment for Shipment

a. General. Detailed instructions for the preparation of the pumping unit for domestic shipment are outlined within this section. Preservation will be accomplished in sequence that will not require the operation of previously preserved components.

b. Inspection. The pumping unit will be inspected for any unusual conditions such as damage, rusting, accumulation of water, and pilferage. Inspection of the individual components and assemblies will be as outlined in Preventative Maintenance Checks and Services (PMCS), paragraph 10.18 of this chapter.

c. Cleaning and Drying. Clean all surfaces of the pumping unit with approved cleaning solvent and dry thoroughly.

d. Painting. Remove rust and corrosion from areas to be painted by sanding. Paint the exposed and sanded surfaces.

e. Depreservation Guide. DA Form 2258 (Depreservation Guide for Vehicles and Equipment).

(1) A properly annotated depreservaton guide will be completed concurrently with preservation of each item of mechanical equipment. Any peculiar requirements will be outlined in the blank space on the form. The completed depreservation quide will be placed with the equipment in a waterproof envelop marked "Depreservation Guide", and fastened in a conspicuous location on or near the operator's controls.

(2) Prior to placing equipment in operation or to the extent necessary for inspection, depreservation of the item will be performed as outlined in the depreservation guide.

f. Marking. The markings will conform to MIL-STD-129.

g. Power Cable. The power cable will be disconnected, coiled, and tied securely to the metal frame.

h. Basis Issue Items. All basic issue items will be packed with the publications in MILVAN with the pumping unit.

10.52. Loading Equipment for Shipment.

The pumping units are not heavy but it is recommended that two or more personnel lift the pump unit into the MILVAN.

10.53. Preparation of Equipment for Limited Storage.

a. Detailed instructions for preparation of the pumping unit for limited storage are provided in TM 740-90-1. Limited storage is defined as storage not to exceed six months.

b. The pumping units should be stored in the Water Distribution Set MILVAN.

10.54. Inspection and Maintenance of Equipment in Limited Storage.

Every 90 days, the pumping units will be inspected as outlined in “Preventative Maintenance Checks and Services (PMCS). Quarterly”. After each inspection period, the pumping unit will be re-preserved as outlined in TM 740-90-1.

MAINTENANCE ALLOCATION CHART

INTRODUCTION

10.55. General.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. This designates overall responsibility for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. The implementation of maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

10.56. Explanation of Columns

a. *Column 1, Group Number.* Column 1 lists the group numbers to identify related components, assemblies, subassemblies, and modules with their next higher assembly. The applicable groups are listed in the MAC in disassembly sequence beginning with the first group removed.

b. *Column 2, Component/ Assembly.* This column contains the noun names of components, assemblies, subassemblies and modules for which maintenance is authorized.

c. *Column 3, Maintenance Functions.* This column lists the functions to be performed on the item listed in Column 2. The maintenance functions are defined as follows:

(1) *Inspect.* To determine serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

MAINTENANCE ALLOCATION CHART

FOR

Pump Centrifugal: Frame Mounted, 1½ inch, MIL-P-14514 Type I, Electric Motor Driven (E. C. Schleyer Model 4M-SE2000)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category * C	O	F	H	D	(5) Tools and Equipmemnt
01	FRAME ASSEMBLY							
0101	Frame and Miscellaneous Hardware	Inspect	0.1					
		Replace		1.0				
02	ACCESSORY ITEMS							
0200	Cable Assembly, Electric	Inspect	0.1					
		Replace		0.5				
	Data Plates	Inspect	0.1					
		Replace				1.0		
03	ELECTRIC MOTOR ASSEMBLY							
0300	Motor Assembly	Inspect	0.1					
		Test			0.5			
		Replace		2.0				
		Repair			3.0			
		Overhaul				4.0		
04	PUMP ASSEMBLY							
0400	Pump	Inspect	0.2					
		Test				2.0		
		Replace		2.0				
		Repair			3.0			
		Overhaul				4.0		

* SUBCOLUMNS ARE AS FOLLOWS: C-OPERATOR/CREW O-ORGANIZATIONAL F-DIRECT SUPPORT H-GENERAL SUPPORT D=DEPOT

** INDICATES WT/MH REQUIRED

ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

The Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List can be found at Appendix C, TM 5-4320-274-14&P.

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CHAPTER 11

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

Including

REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)

PUMP, CENTRIFUGAL: FRAME MOUNTED, 1½-INCH ELECTRIC MOTOR DRIVEN
Modified Grainger Model 4XZ11 Pump

NSN: 4320-01-506-4459

INTRODUCTION

11.1 Scope

This chapter is for your use in operating and maintaining the Grainger/Teel Model 4XZ11 electric motor driven pump. Which is a component of the newer versions of the Water Distribution Set, MRI 84-Bed and Water Distribution Set, MRI 1640Bed. This chapter provides information relative to the operation, preventive maintenance and organizational maintenance of the equipment. It also provides information on the direct support and general support maintenance, repair instructions, and provides information on administrative storage.

11.2 Maintenance Forms and Records

Maintenance forms and records that you require are explained in TM 38-750.

11.3 Equipment Serviceability Criteria (ESC)

This equipment is not covered by an ESC.

11.4 Description This pump is a replacement for the E.C. Schleyer Pump (NSN 4320-01-440-2221), used in the earlier versions of the Water Distribution Set, DEPMEDS, Hospital, MF2K (NSN: 6545-01-435-6014). It is an electric motor driven, portable, frame-mounted unit (figure 11.1) designed to pump water at the rate of 65 GPM (gallons per minute) at the following ratings of total head in feet.

Total Head (in feet)	Gallons per Minutes
10	107
20	103
30	98
40	92
50	87
70	73
90	55
110	32

Table 11-1
GPM Ratings

Figure 11-2
Teel, High Head Centrifugal Pump Motor 4XZ11

11.4.1 The pump is equipped with A Teel High Head Centrifugal Pump motor, model 4XZ11. The motor is a 2-hp (horsepower) unit encased in a heavy-duty housing (figure 11-2).

11.4.2 If you need a detailed description of any component of the electric motor drive pump, please refer to http://www.grainger.com/Grainger/searchresults.jsp

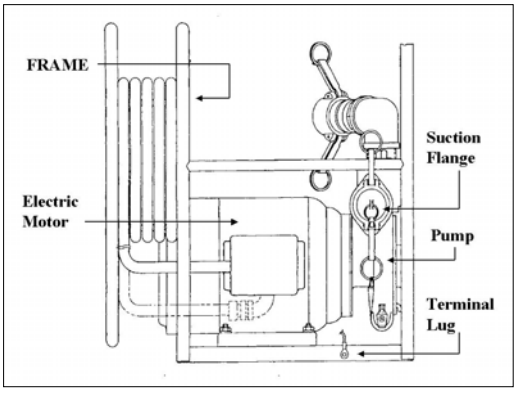

Figure 11-1
Electric motor driven pump
(front view)

OPERATING INSTRUCTIONS

WARNING
IF EQUIPMENT FAILS TO OPERATE, REFER TO THR TROUBLESHOOTING PROCEDURES

11.5 Operation of the Centrifugal Pump

11.5.1 The instructions in this section are published for the information and guidance of the personnel responsible for the operation of the pump units.

11.5.2 The operator must know how to perform every operation of which the pump units are capable.

This section gives instructions for starting and stopping the pump units, operation of the pump units, and coordinating the basic motions to perform the specific tasks for which the equipment was designed. Since every job presents a difference problem, the operator must have to vary given procedures to fit the individual job.

11.6 Starting

11.6.1 Preparation for starting. Perform daily preventive services in accordance with Table 11.2

Table 11.2 Preventive Maintenance Checks and Services (PMCS) – Before Operation

Sequence Number	Item to be Inspected Procedure
1	ELECTRICAL LINES AND CONNECTIONS Inspect lines for breaks and frayed connections Check for loose connections
2	PIPE PLUG Check for leaks, other damage, and tightness
3	ELECTRIC MOTOR Inspect for dirt, foreign matter, and damage. The motor openings shall be clean and free of foreign matter, and shall show no damage.
4	ELECTRIC MOTOR Check to see that the motor is securely mounted. The exterior surface of the motor shall be clean, free of dust, dirt, grease and fungus. All connections and terminals shall be secure.
5	PUMP BODY Inspect for leaks, cracks, and other damage. The exterior surface should be clean, free of dust, dirt, grease, and fungus.

11.6.2 Starting Instructions. To start the electric powered pump, connect the power cable to a 3-phase, 208-volt, 60 hertz power source, using the power connector supplied with the unit.

11.7 Stopping.

Disconnect the power cable from the source of power.

11.8 Operation of Equipment

The operation of the pump is largely automatic. The operator should maintain watch over overheating, failure to perform to rated efficiency, and vibration. **Proper care and maintenance will insure efficient operation.**

OPERATION UNDER UNUSUAL CONDITIONS

11.9 Operation in Extreme Cold

11.9.1 Keep the unit free of snow and ice. Cover the unit when not in use. Provide a suitable shelter for the unit during outside operation.

11.9.2 To avoid freezing, drain the pump after operation.

11.9.3 In extreme cold, do not use this unit outside.

CAUTION
Do not use this pump in temperatures below freezing without the Heaters, Water NSN: 6520-01-493-7423 being installed and operating.

CAUTION
Do not overheat the pump body.

11.10 Operation in Extreme Heat

11.10.1 Protect the unit from the direct rays of the sun.

11.10.2 Maintain adequate space around the unit to provide heat dissipation. If operating in an enclosure, provide a fan to circulate air when possible.

11.10.3 Keep the unit clean to provide proper heat transfer to the air.

11.11 Operation in Dusty or Sandy Areas

Shield the unit from dust. Take advantage of natural barriers that offer protection from blowing sand and/or dust, or erect a suitable shield if necessary.

11.12 Operation Under Rainy or Humid Conditions

11.12.1 Cover the unit with a waterproof cover when outside and inoperative. During operation, take advantage of natural barriers that offer protection from storms, or erect a suitable shelter to protect the unit.

11.12.2 Keep electrical cables, wires, and parts free of moisture and clean.

11.13 Operations in Salt Water Areas

11.13.1 Salt water caused corrosive action on metal. Exercise care to keep the unit from contact with salt water. Wash the unit frequently with fresh water.

11.13.2 Paint all exposed non-polished metal surfaces with standard issue rust preventative, if available, or cover with a light coat of grease.

11.13.3 Flush the pump if salt water has entered the pump body. Flush if there has been a possibility of salt water contamination.

Table 11.3 Preventive Maintenance Checks and Services (PMCS) – During Operation

Sequence Number	Item to be Inspected Procedure
1	PUMP UNIT Inspect the entire unit for operational damage
2	PUMP UNIT Clean the pump unit with clear water, rinse, and wipe dry

Table 11.4 Preventive Maintenance Checks and Services (PMCS) – After Operation

Sequence Number	Item to be Inspected Procedure
1	PIPE PLUG Check for leaks, other damage, and tightness
2	ELECTRIC MOTOR Inspect for dirt, foreign matter, and damage. The motor openings shall be clean and free of foreign matter, and shall show no damage.
3	SUCTION VALVE Check the suction valve for operation operation and leaks

TROUBLE SHOOTING

11.14 General

11.14.1 This section contains troubleshooting information for locating and correcting most of the operating troubles that may develop in the electrical motor driven pump. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections that will help you determine probable causes and corrective actions to take. You should perform the tests/ inspections and corrective actions in the order listed.

11.14.2 This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or it is not corrected by the listed corrective actions, notify your supervisor.

NOTE

Before you use this table, be sure that you have performed all of the applicable operating checks.

Table 11.5 Troubleshooting

Malfunction Test or Inspection Corrective Action
ELECTRIC MOTOR
1. ELECTRIC MOTOR FAILS TO FUNCTION PROPERLY
Check for loose or corroded wiring connections Clean corroded connections. Tighten loose connections at electric motor, ground, and connector.
2. ELECTRIC MOTOR OVERHEATS
Step 1: Check power source voltage If the power source is too low, too high, or unbalanced, connect the electric motor to a proper power source. *Step 2:* Check motor for binding If the motor has restrictive rotation, notify organization maintenance.
PUMP
3. PUMP FAILS TO FUNCTION PROPERLY
Check to see if air is entering pump body through loose connections Tighten loose connections and be certain hoses have no leaks.

Table 11.5 Troubleshooting (continued)

Malfunction
Test or Inspection
Corrective Action

4. PUMP LEAKS DURING OPERATION

Inspect for any visible leakage near seal or suction valve
Notify organizational maintenance, when leakage occurs.

5. NO WATER OR INSUFFICIENT WATER OUTLET PRESSURE

Step 1: Ascertain if pump is primed
Prime pump
Step 2: Inspect water lines for clogging
Remove the water lines (both input and output), clean clogged area, and replace the lines on the unit.

ORGANIZATION MAINTENANCE INSTRUCTIONS

SERVICE UPON RECEIPT OF SYSTEM

11.15 Inspecting and Servicing Equipment

11.15.1 Inspection

11.15.1.1 Make a complete visual inspection of the unit to assure that all accessories, attachments, publications, and required tools have been delivered with the pumping assembly.

11.15.1.2 Inspect the unit for loss of parts or hardware.

11.15.1.3 Rotate the pump by hand prior to starting the unit; this will assure freedom of action of components.

11.15.1.4 If used equipment is being inspected, pay particular attention to all inspection procedures.

11.15.2 Servicing Equipment

11.15.2.1 The equipment is shipped complete and ready for operation.

11.15.2.2 Perform the daily preventive maintenance checks and services (tables 11.2, 11.3, and 11.4).

11.16 Installation of Separately Packed Components

The pumps are packed as single units and therefore require no specific instructions for the installation of separately packed components.

11.17 Installation and Setting-Up Instructions

11.17.1 Set the unit on the ground that is as flat and level as possible, and not more than 25 feet above liquid.

11.17.2 Connect the potable water hose lines to the input and discharge fittings.

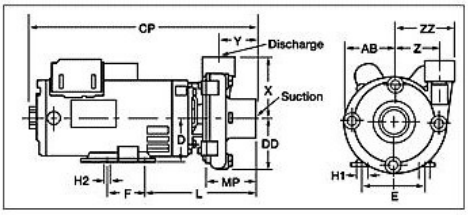

Figure 11-3
Pump Schematics
(showing input and discharge ports)

MOVEMENT TO A NEW SITE

11.18 Dismantling for Movement

11.18.1 Disconnect the potable water hose lines from the inlet and discharge ports.

11.18.2 Cover the inlet and discharge ports, with Plug, Quick Disconnect (NSN: 4730-00-823-5316) for the inlet port, and Cap, Quick Disconnect (NSN: 4730-00-869-5246) for the discharge port, to prevent foreign materiel from entering the pump.

11.19 Reinstallation After Movement

Refer to paragraph 11-17 and reinstall the pump unit.

REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

11.20 Tools and Equipment

11.20.1 Basic tools and repair parts issued with, or authorized for this unit are listed later in this chapter.

11.20.2 Organizational personnel for maintenance of this unit require no special tools or equipment.

11.21 Organizational Maintenance Repair Parts

Repair parts and equipment are listed and illustrated in the repair parts and special tools list covering organizational maintenance for this equipment later in this chapter.

LUBRICATION INSTRUCTIONS

11.22 The electric motor powered pump has been pre-lubricated at the factory and requires no specific lubrication.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

11.22 General

To ensure that the pumping units are ready for operations at all times, they must be systematically inspected so that defects may be discovered and corrected before they results in serious damage or failure. The necessary PMCS to be performed are listed in paragraph 11.23. All deficiencies and short-Comings will be recorded, together with the corrective action taken on DA Form 2404 (Equipment Inspections and Maintenance Worksheet).

11.23 Preventative Maintenance Checks and Services

Refer to table 11.7 for the applicable PMCS.

Table 11.7 Preventative Maintenance Checks and Services (PMCS) – Organizational Maintenance

M – Monthly Q – Quarterly

Interval Sequence No. M	Interval Sequence No. Q	Item to be Inspected Procedure
1	9	APPEARANCE OF EQUIPMENT Clean entire unit with clear water, rinse, and dry
2	10	ELECTRICAL LINES AND CONNECTIONS Inspect lines for breaks and frayed insulation. Check for loose connections.
3	11	PIPE PLUG Check for leaks and other damage
4	12	ELECTRIC MOTOR Inspect for dirt, foreign matter and damage. Check to see that the motor is securely mounted. The exterior surface of the motor should be clean, free of dust, dirt, grease, and fungus. All connections and terminals shall be secure.
5	13	HARDWARE
6	14	PUMP BODY Inspect for cracks, leaks, or other damage. The exterior surface should be clean, free of dust, dirt, grease, and fungus.

Table 11.7 Preventative Maintenance Checks and Services (PMCS) – Organizational Maintenance (continued)

M – Monthly Q – Quarterly

Interval Sequence No.		Item to be Inspected Procedure
M	Q	
8	16	PUMP UNIT Inspect the entire unit for operational damage. Check each component for wear and damage.

TROUBLESHOOTING

11.24 General

This section provides information useful in diagnosing and correcting unsatisfactory performance or failure of the pump units and components.

11.25 Troubleshooting

Refer to table 11.8 for troubleshooting procedures.

Table 11.8. Troubleshooting

Malfunction
Test or Inspection
Corrective Action

ELECTRIC MOTOR

1. ELECTRIC MOTOR FAILS TO FUNCTION PROPERLY

Step 1. Check for loose or corroded wiring connections.
Step 2. Check for correct connection of phase wires.
Reverse phase wires.
Step 3. Check for defective motor.
If phase wires, ground and power source are wired correctly, but the motor does not function properly, replace the unit.

Table 11.8. Troubleshooting

Malfunction
Test or Inspection
Corrective Action

2. ELECTRIC MOTOR OVERHEATS

Step 1. Check power source voltage.
If the power source is too low, too high, or unbalanced, connect the electric motor to a proper power source.
Step 2. Check motor for binding.
If the motor has restrictive rotation, replace the unit.

PUMP

3. PUMP FAILS TO FUNCTION PROPERLY

Check to see if air is entering the pump body through loose connections.
Tighten loose connections and be certain hoses have no leaks.

4. PUMP LEAKS DURING OPERATION

Inspect for any visible leakage near seals or suction valve.
Any evidence of leakage, notify general support, and replace unit.

5. NO WATER OR INSUFFFICIENT WATER OUTLET PRESSURE

Step 1. Ascertain if pump is primed.
Prime pump.
Step 2. Inspect potable water hose lines for clogging.
Remove the potable water lines, clean clogged area(s), and replace on unit.
Step 3. Excessive suction lift.
Locate pump closer to liquid.
Step 4. Air leaks on inlet side of pump.
Check fittings and water lines. Correct leak.

11.27 Preparation of Equipment for Shipment

11.27.1 General. Detailed instructions for the preparation of the unit for domestic shipment are outlined within this section. Preservation will be accomplished in sequence that will not require the operation of previously preserved components.

11.27.2 Inspection. The unit will be inspected for any unusual conditions, such as damage, rusting, accumulation of water, and pilferage. Inspection of individual components and assemblies will be as outlined in the PMSC section of this chapter.

11.27.3 Cleaning and Drying. Clean all surfaces of the pump unit with approved cleaning solvent and dry thoroughly.

11.27.4 Painting. Remove rust and corrosion from areas to be painted by sanding. Paint the exposed and sanded surfaces.

11.27.5 Depreservation Guide. DA Form 2258 (Depreservation Guide for Vehicle and Equipment).

11.27.5.1 A properly annotated depreservation guide will be completed concurrently with preservation of each item of mechanical equipment. Any peculiar requirements will be outlined in the blank space on the form. The completed depreservation guide will be placed with the equipment in a waterproof envelop marked "Depreservation Guide", and fastened onto the pump frame.

11.27.5.2 Prior to placing equipment in operation or to the extent necessary for inspection, depreservation of the item will be performed as outlined in the depreservation guide.

11.27.6 Marking. The markings will conform to MIL-STD-129.

11.27.7 Power Cable. The power cable will be coiled and tied securely to the metal frame.

11.27.8 Basic Issue Items. All basic issue items will be packed in the MILVAN with the pumping unit.

11.28 Loading Equipment for Shipment

The pumps are not heavy, but it is recommended that two or more personnel lift the pump into the MILVAN.

11.29 Preparation of Equipment for Limited Storage

11.29.1 Detailed instructions for preparation of the pump for limited storage are provided in TM 740-90-1. Limited storage is defined as storage not to exceed six months.

11.29.2 The pumps should be stored in the Water Distribution Set and the Waste Water Augmentation Set MILVANs.

11.30 Inspection and Maintenance of Equipment in Limited Storage

Every 90 days, the pumps must be inspected as outlined in "Preventive Maintenance Checks and Services (PMCS), Quarterly". After each inspection period, the pumps will be re-preserved as outlined in TM 740-90-1.

MAINTENANCE ALLOCATION CHART

INTRODUCTION

11.31 General

11.31.1 This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

11.31.2 This designates overall responsibility for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. The implementation of maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

11.32 Explanation of Columns

11.32.1 *Column 1, Group Number.* Column 1 lists the group numbers to identify related components, assemblies, subassemblies, and modules with their next higher assembly. The applicable groups are listed in the MAC in disassembly sequence beginning with the first group removed.

11.32.2 *Column 2, Component/ Assembly.* This column contains the noun names of components, assemblies, subassemblies and modules for which maintenance is authorized.

11.32.3 *Column 3, Maintenance Functions.* This column lists the functions to be performed on the item listed in Column 2. The maintenance functions are defined as follows:

11.32.3.1 *Inspect.* To determine serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

11.32.3.2 *Test.* Top verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

11.32.3.3 *Service.* Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic-fluids, or compressed air supplies.

11.32.3.4 *Adjust.* To maintain within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

11.32.3.5 *Align.* To adjust specified variable elements of an item to bring about optimum or desired performance.

11.32.3.6 *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipment used in precision measurements. Consists of comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

11.32.3.7 *Install.* The act of emplacing, seating, or fixing into position an item, part or module (Component or assembly) in a manner to allow the proper functioning of an equipment or system.

11.32.3.8 *Replace.* The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

11.32.3.9 *Repair.* The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

11.32.3.10 *Overhaul.* That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the army. Overhaul does not normally return an item to a like new condition.

11.32.3.11 *Rebuild.* Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to army equipment.

MAINTENANCE ALLOCATION CHART

FOR

PUMP, CENTRIFUGAL: FRAME MOUNTED, 1½-INCH ELECTRIC MOTOR DRIVEN Modified Grainger Model 4XZ11 Pump

NSN: 4320-01-506-4459

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category * C	O	F	H	D	(5) Tools and Equipment
01	FRAME ASSEMBLY							
0101	Frame and Miscellaneous Hardware	Inspect	0.1					
		Replace		1.0				
02	ACCESSORY ITEMS							
0200	Cable Assembly, Electric	Inspect	0.1					
		Replace		0.5				
	Connector, Electric	Inspect	0.1					
		Replace		2.0				
03	MOTOR AND PUMP							
0300	ASSEMBLY							
		Inspect	0.2					
		Test			2.5			
		Replace			3.0			
		Repair				6.0		
		Overhaul					10.0	

* SUBCOLUMNS ARE AS FOLLOWS: C-OPERATOR/CREW O-ORGANIZATIONAL F-DIRECT SUPPORT H-GENERAL SUPPORT D-DEPOT

** INDICATES WT/MH REQUIRED

ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

For Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools, see Appendix G of this manual.

CHAPTER 12

OPERATOR AND MAINTENANCE MANUAL

PUMP UNIT, RECIPROCATING
13229E7222, ELECTRIC MOTOR DRIVEN
(EDSON CORPORATION, MODEL 120EWA)

NSN 4320-01-440-7388

12.1 Introduction

This chapter is for your use in operating and maintaining the Edson Corporation, Model 120EWA, electric motor driven reciprocating pump.

12.2 Maintenance Forms and Records

Maintenance forms and records that you are required to use are explained in TM 38-750.

12.3 Equipment Serviceability Criteria (ESC)

This equipment is not covered by an ESC.

12.4 Description

a. General. The electric motor driven pump (figure 12.1) is a portable, frame mounted, unit designed to evacuate wastewater at the maximum rate of 2,600 gallons per hour at 60 strokes per minute.

b. The pump is equipped with a ¾-HP (horsepower), capacitor start, ball bearing motor.

c. If you need a detailed description of any component of the electric motor driven pump, refer to the applicable organizational maintenance information.

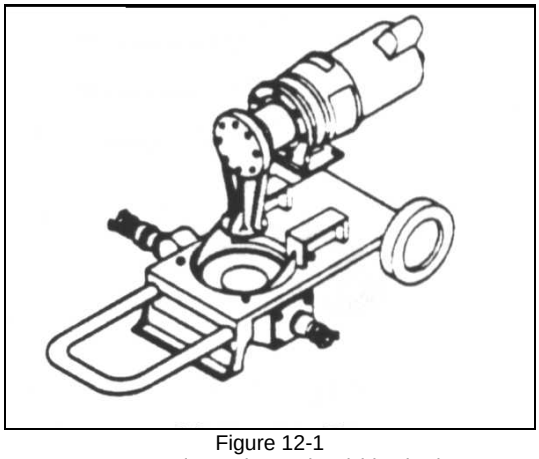

Figure 12-1
Pump Unit, Reciprocating (side view)

12.5 Principles of Installation.

12.5.1 The information in this chapter provides guidance to help plan the location of the pumps in the Wastewater Management Sets.

12.5.2 *Location of Pumps.* Locate pumps on each loop close to the collection, or discharge, site. Note that the power cable on the pump is 40 feet long. **DO NOT USE AN EXTENSION CORD**. Elevate electrical connections on wooden blocks above areas where puddles may form. The pump should be supplied by a dedicated branch circuit protected by a fuse or circuit breaker rated at no more than 15 amps.

12.6 Preventive Maintenance.

The following preventative checks and services should be done daily. They should also be done prior to storing or moving the pump.

12.6.1 Check the valves. If the discharge valve does not seat properly, vacuum lift is lost. If the intake valve does not seal, pump efficiency will be lost.

12.6.2 Check the diaphragm for leaks and wear.

12.6.3 **Grease the eccentric drive daily** with 4 to 6 strokes of a grease gun.

12.7 Maintenance and Troubleshooting.

12.7.1 Diaphragm and Flapper Valves. These are the primary moving parts of the pump. If the diaphragm leaks, pump efficiency will be lost. If the discharge valve does not seat properly, vacuum lift will be lost. If the intake valve does not seal, pump efficiency will be lost.

12.7.1.1 To check, use a vacuum gauge on the intake of the pump. A reading of 8- to 10-inches Hg indicates all valves and seals are working properly. In lieu of a gauge, place hand over intake and check vacuum. Strong suction indicates good sealing by the valves.

12.7.1.2 Look for wear and swelling on the valve, rubber (PN: 161-G-107). Swelling can prevent a good seal. Replace valves as required.

NOTE
Over-tightening Valve Rubber Washer and Weights on the inlet and outlet chambers can cause distortion of the valves and poor seal performances.

12.7.1.3 Check diaphragms for Leaks and wear. Replace as required with Diaphragm Valve, Flat (NSN: 4820-01-393-5286, PN: 113-0).

12.7.1.4 Grease eccentric drive Every 48 to 72 hours of continuous run operation at full RPM, or as required.

12.7.2 Troubleshooting Guide. See Table 12.1 below:

Table 12-1, Troubleshooting

Problem
Cause
Corrective Action

1. PUMP IS PUMPING, NO LIQUID IS BEING PUMPED

Clogged inlet or discharge line, clogged inlet or discharge chamber
Locate and unclog line

No vacuum

Blocked discharge valve (held open)
Clear valve

Hole in inlet hose
Repair or replace hose

Loose fitting on inlet
Make air tight

Worn discharge valve rubber
Replace valve rubber

Worn diaphragm
Replace diaphragm

Inlet vertical head too high or discharge head too high
See set-up instructions above.

Motor not working
Check electrical connections

Pump base chamber has solids trapped and preventing pump from cycling
Clear pump base chamber.
Increase pump speed to prevent solid from dropping out
Use strainer on inlet hose

2. PUMP LEAKS

Loose head ring bolts
Tighten

Loose standard/bolt
Tighten

Diaphragm worn/split
Replace

Table 12-1, Troubleshooting

Problem Cause Corrective Action
Discharge vertical head too high
3. PUMP BASE CHAMBER KEEPS FILLING WITH SOLIDS.
CAUTION **THIS PROBLEM CAN LEAD TO COMPLETE STOPPING OF PUMP AND DAMAGE TO DRIVE OR PUMP.**
Pump running too slow or with too short a stroke to move solids. Run pump faster, extend stroke, no faster than 60 cycles per minute.
Overall head is too great to move solids through. Reduce head.

12.8 General Operating Guidelines

12.8.1 General Operating Guidelines

12.8.1.1 Diaphragm pumps are suction pumps. They are designed to create a vacuum on the intake (up) stroke of the pump and positively displace the pump chamber on the down stroke.

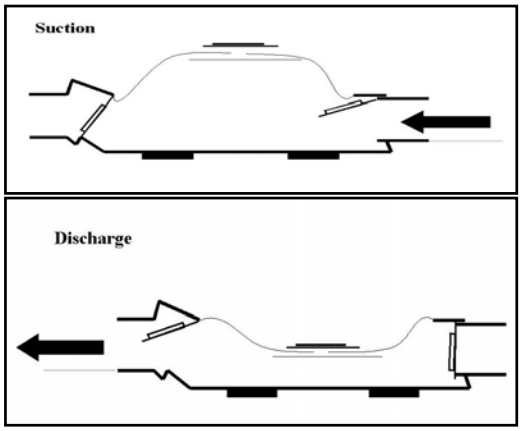

Figure 12-2
Suction and Discharge

12.8.1.2 Direction of flow and the vacuum lift of the pump are maintained by opposed inlet and outlet flapper valves.

12.8.1.3 Once the vacuum is filled with liquid, lifting it vertically is easier on the intake stroke.

12.8.1.4 The force required to displace the pump chamber on the down stroke increases with the height of the discharge above the pump and the volume of liquid in the discharge head.

12.8.1.5 Any restrictions to flow decreases lift on the intake side and increases force required for discharge.

12.8.1.6 Increase in viscosity is a resistance to flow and requires more time for liquid to flow. An increase in

viscosity decreases lift and discharges heads.

CAUTION
This pump is not designed to be used in cold weather. Using this pump in freezing weather will cause the pump to burn out.

12.8.2 Insure Vacuum.

12.8.2.1 All inlet fittings and hoses should be airtight. Use appropriate tape (Tape, Antisiezing [NSN 8030-00-889-3534, PN: A-A-58092]). On all threaded fittings.

12.8.2.2 Flapper Valves must be making good seals.

12.8.2.3 Diaphragm must have good seal and be free of holes.

12.8.2.4 Pump should be level When in use.

12.8.3 Prevent Clogging. Run the pump at speed necessary to move solids through the hoses and pump base.

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CHAPTER 13

OPERATOR AND MAINTAINER INSTRUCTION

HYPOCHLORINATION UNIT
Waltron Model WAL 1031-96

NSN: 4610-01-435-4884

INTRODUCTION

13.1 Scope

13.1.1 This chapter is for your use in operating and maintaining the Waltron (WAL 1031-96) Hypochlorination Unit. This unit is a components of the following sets:

LIN	NSN	Nomenclature
W53055	6545-01-435-6014	Water Distribution Set, Hospital, DEPMEDS, MF2K
W53055	6545-01-507-7170	Water Distribution Set, Hospital, MF2K – 2003
W49603	6545-01-435-6013	Waste Water Augmentation Set, Hospital, DEPMEDS, MF2K
Z46694	6545-01-491-4732	Water Distribution Set, MRI 84-Bed
Z00133	6545-01-502-4969	Water Distribution Set, MRI 164-Bed

13.1.2 This chapter provides information relative to the operation, preventive maintenance, and organizational maintenance of the item.

13.2 Maintenance Forms and Records

Maintenance forms and records that you require are explained in TM 38-750.

13.3 Equipment Serviceability Criteria (ESC)

This equipment is not covered by an ESC.

13.4 Description This unit is designed to provide the capability of injecting Sodium Hypochlorite into the potable water lines for the prevention of fungus and bacterial growth in the lines. This unit delivers up to 0.55 gal/hr of a Hypochlorite solution into the lines, against a pressure of up to 150 psi maximum. The chemical feed rate is controlled by adjusting pump stroke length and pump frequency over 0-100% of range. It is electrically powered at 110/120V, 50/60HZ. When connected to the potable water line, this unit will chlorinate the water unattended from 24 hours to 4 days, depending on the amount, flow rate, and quality of the water being treated.

Figure 13-1
Hypochlorination Unit

OPERATING INSTRUCTIONS

13.5 Operations of the Hypochlorination Unit

13.5.1 The instructions in this section are published for the information and guidance of the personnel responsible for the operation of the pump units.

13.5.2 The operator must know how to perform every operation of which the hypochlorination unit is capable, The operator must also know the steps and coordinations required prior to operating this unit.

13.5.3 This section gives instructions for set-up, starting, and stopping the pump units, and operation of the unit.

13.6 Starting

13.6.1 Set-Up.

13.6.1.1 Connect the tubing from tank suction line to lower intake port on pump.

13.6.1.2 Attach the tubing located between the relief and backpressure valve to the upper discharge port on the pump.

13.6.1.3 Attach one end of the 25-foot discharge tubing to the end of the injection nozzle assembly, and the other end to the Tee Assembly, Quick Disconnect, 1½-inch Female x 1½-inch Male x ¼-inch Male (NSN 4730-01-487-3575).

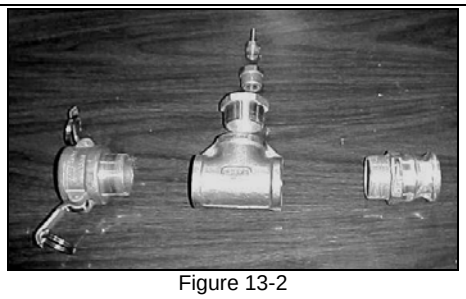

Figure 13-2
Tee Assembly
1½-inch F x 1½-inch M x ¼-inch M

13.6.1.4 Using the Can, Water, Military, Plastic 5-gallon (NSN: 7240-00-089-3827) which is packed in the Water Distribution Set MILVAN, add potable water to the tank. Do not fill tank to maximum at this point, 20-50L (5-13 gallons) is recommended.

13.6.1.5 Coordinate with the Preventive Medicine Specialist (MOS 91S) to test the available potable water, and determine the amount of granular Sodium Hypochlorite which must be added to the tank.

13.6.1.6 The Preventive Medicine Specialist (91S) should add the appropriate amount of grandular hypochlorite to tank, determined by site and use requirements.

NOTE
First dissolve the sodium Hypochlorite in the Can, Water, Military, Plastic, 5-gallon which has been filled with 1 to 5 gallons of water before adding it to tank. This is a good pre-mix procedure.

The recommended dosage is a minimum Chlorine level of 65% which would mean adding 60 oz. of Calcium Hypochlorite per 100L of potable water.

13.6.1.7 Fill tank to 100L (approximately 26½-gallons)with potable water.

13.6.2 Start-Up

13.6.2.1 Plug unit into a 110V/60HZ power source.

NOTE
The point stroke length should be set at Zero and the stroke frequency set at Ext.

CAUTION
Stroke length must NEVER be moved until flow has started.

13.6.2.2 Set frequency knob to internal (100%). This starts maximum flow.

13.6.2.3 Loosen locking screw on stroke length and set to MAX (100%).

13.6.2.4 Run the unit at these settings until the flow starts and the lines are air free. (Approximately 5-minutes)

13.6.2.5 Reduce the stroke length and frequency until the desired rate is achieved.

NOTE
For best pump efficiency, use similar settings on stroke length and frequency.

13.6.2.6 Tighten locking screw on stroke length knob.

13.6.2.7 Proceed with chemical feed. The Preventive Medicine Specialist (91S) should test the system for chlorine level and adjust if necessary.

13.7 Shutdown

13.7.1 Set stroke length to Zero. Set stroke frequency to Ext.

13.7.2 Disconnect power.

13.8 Operation of Equipment

13.8.1 The operation of the hypochlorination unit is largely automatic. The operator should maintain watch over failure to perform to rated efficiency and chlorine level in the tank. **Proper care and maintenance will insure efficient operation.**

13.8.2 The chlorine level should be checked daily by the Preventive Medicine Specialist (91S).

13.8.3 The shut-down and start-up procedures should be followed at every refill of the Tank, Fabric Collapsible.

OPERATION UNDER UNUSUAL CONDITIONS

13.9 Operation in Extreme Cold

13.9.1 Keep the unit free of snow and ice. Cover the unit when not in use. Provide a suitable shelter for the unit during outside operation.

13.9.2 To avoid freezing, drain the tank and purge the lines after operation.

13.9.3 In extreme cold, do not use the unit outside.

CAUTION
Do NOT use this unit in temperatures below freezing without the Heaters, Water (NSN: 6520-01-493-7423 being installed and properly operating.

13.10 Operation in Extreme Heat

13.10.1 Protect the unit from the direct rays of the sun.

13.10.2 Keep the unit clean.

13.11 Operation in Dusty or Sandy Areas

13.11.1 Shield the unit from dust. Take advantage of natural barriers that offer protection from blowing sand and/or dust, or erect a suitable shield, if necessary.

13.11.2 Prevent dust and/or sand from entering the tank of the unit. If dust and/or sand is present in the tank, flush the entire unit until

clean and then follow the set-up procedures.

13.12 Operation Under Rainy or Humid Conditions

13.12.1 Cover the unit with a waterproof cover when outside and inoperative. During operation, take advantage of natural barriers that offer protection from storms, or erect a suitable shelter to protect the unit.

13.12.2 Keep the power cord and parts free of moisture and clean.

13.13 Inspecting and Servicing the Unit

13.13.1 Inspection

13.13.1.1 Make a complete visual inspection of the unit to assure that all of the accessories, attachments, publications, and required items have been delivered with the hypochlorination unit.

13.13.1.2 Inspect the unit for loss of parts or hardware.

13.13.1.3 Inspect the unit to ensure that the pump has been properly mounted on the 100 Liter tank. If it has not been mounted, or if it has come loose, mount the pump on the mounting block. Secure be tightening the four supplied set screws.

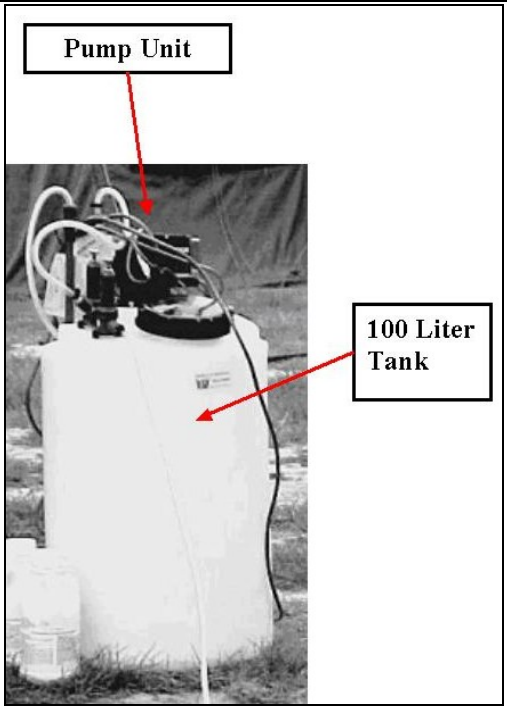

Figure 13.3
Hypochlorination Unit

13.13.2 Servicing the Unit

13.13.2.1 The unit is shipped complete and ready for operation.

13.13.2.2 Perform the daily preventive maintenance checks and services (tables 13.1, 13.2 and 13.3).

Table 13.1 Preventive Maintenance Checks and Services (PMCS) – Before Operation

Sequence Number	Item to be Inspected Procedure
1	ELECTRIC POWER CORD AND CONNECTIONS
	Inspect the power cord for breaks and frayed connections
	Check for loose connections
2	100 LITER TANK
	Inspect the tank for holes and leaks
	Inspect threads to mount the tank top to the unit
	Inspect the pump mounting block for damage
3	PUMP UNIT
	Inspect the pump unit for damage
	Check the control panel shield to determine if it has a tight fit to the pump controls
	Check the control knobs for damage and tightness
	Check to make sure that the set screws are present and functioning properly
	Check to see that the hose from the tank is properly connected to the pump unit and that it is unclogged and undamaged

Table 13.2 Preventive Maintenance Checks and Services (PMCS) – During Operation

Sequence Number	Item to be Inspected Procedure
1	PUMP UNIT
	Inspect the entire unit for operational damage
2	TANK
	Inspect the tank for operational damage and leaks
3	HYPOCHLORINATION UNIT
	Clean the hypochlorination unit with clean, clear water, rinse, and wipe dry

Table 13.3 Preventive Maintenance Checks and Services (PMCS) – After Operation

Sequence Number	Item to be Inspected Procedure
1	TANK Inspect for dirt, foreign matter, and excessive discoloration Check for leaks and other damage
2	PUMP UNIT Inspect for dirt, foreign matter, and damage. The control cover shall be clean and fit properly. The controls shall move freely (without binding). The pump unit shall show no damage. The pump unit shall be securely mounted on the tank mount.

WARNING

Sodium Hypochlorite is a caustic substance. Contact with acids releases a poison gas (chlorine), and is light sensitive. It is a corrosive substance that may cause burns to skin and eyes. It is harmful by ingestion, inhalation, or through prolonged skin contact.

Use in a well-ventilated area and protect eyes.

CAUTION

Sodium Hypochlorite is hazard class 8 (Corrosive Substance), packing group III (Minor Danger) substance.

This item is packed with the Maintenance Set and care should be exercised in its use, storage, and transportation.

TROUBLESHOOTING

13.14 General

13.14.1 This section contains troubleshooting information for locating most of the operating troubles that may develop in the hypochlorination unit. Each malfunction for an individual component is followed by a list of tests or inspections that will help you determine probable causes and corrective actions to take. You should perform the tests/ inspections and corrective actions in the order listed.

13.14.2 This manual cannot list all of the malfunctions that may occur, nor all of the tests or inspections and corrective actions. If a malfunction is not listed, or it is not corrected by the listed corrective actions, notify your supervisor.

NOTE

Before you use this table, be sure that you have performed all of the applicable operating checks.

Table 13.4 Troubleshooting

Malfunction
Test or Inspection
Corrective Action

PUMP

1. PUMP FAILS TO FUNCTION PROPERLY

Step 1: Check for loose or corroded power cord connections
Tighten loose connections, clean corroded connections
Step 2: Check power source voltage
If the power source is too low, too high, or unbalanced, connect to a proper power source

2. UNIT FAILS TO CHLORINATE THE WATER LINES

Step 1: Check to see that the feed line from the tank to the pump is properly connected
Connect the feed line correctly
Step 2: Check the feed line from the tank to the pump for clogs and kinks
If clogged, disconnect the feed line, clear the clog and reconnect the feed line
If the feed line is kinked, straighten the feed line or replace

Table 13.4 Troubleshooting (continued)

Malfunction Test or Inspection Corrective Action
TANK
3. TANK FAILS TO MAINTAIN FLUID LEVEL
Check tank for leaks If leak is found, replace unit

MOVEMENT TO A NEW SITE

13.15 Dismantling for Movement

13.15.1 Disconnect the power chord from the power source.

13.15.2 Disconnect one end of the 25-foot discharge tubing from the Tee Assembly, 1½-inch Female x 1½-inch Male x ¼-inch Male.

13.15.3 Disconnect the Tee Assembly, 1½-inch Female x 1½-inch Male x ¼-inch Male from the potable water line.

13.15.4 Cover the 1½-inch Female end of the tee assembly with Plug, Quick Disconnect, 1½-inch (NSN 4730-00-823-5316). Cover the 1½-inch Male end of the tee assembly with Cap, Quick Disconnect 1½-inch (NSN 4730-00-869-5246), to prevent foreign material from entering the tee assembly.

13.15.5 Coil and tie the discharge tubing to the unit.

13.15.6 Coil and tie the power cord to the unit.

13.15.7 Pack the tee assembly with the Hypochlorinator Unit.

13.16 Reinstallation After Movement

Refer to paragraph 13.6 and reinstall the hypochlorination unit.

REPAIR PARTS, SPECIAL TOOLS, AND EQUIPEMENT

13.17 Tools and Equipment

Organizational personnel for maintenance of this unit require no special tools or equipment. Basic tools will be used.

13.18 Organizational Maintenance Repair Parts

There are no repair parts for the Hypochlorination Unit. The Tee Assembly is listed in the RPSTL portion of this manual.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

13.19 General

To ensure that the hypochlorination unit is ready for operations at all times, it must be systematically inspected so that defects may be discovered and corrected before they results in serious damage or failure. The necessary PMCS to be performed are listed in paragraph 13.20. All deficiencies and shortcomings will Be recorded, together with the corrective action taken on DA Form 2404 (Equipment Inspections and Maintenance Worksheet).

13.20 Preventive Maintenance Checks and Services

Refer to table 13.5 for the applicable PMCS.

Table 13-5 Preventive Maintenance Checks and Services (PMCS) – Organizational Maintenance

M – Monthly Q – Quarterly

Interval Sequence No.		Item to be Inspected Procedure
M	Q	
1	7	APPEARANCE OF EQUIPMENT Clean entire unit with clean, clear water, rinse, and dry
2	8	ELECTRICAL LINES AND CONNECTIONS Inspect power cord for breaks and frayed insulation Check for loose connections

Table 13-5 Preventive Maintenance Checks and Services (PMCS) – Organizational Maintenance (continued)

M – Monthly Q – Quarterly

Interval Sequence No.		Item to be Inspected Procedure
M	Q	
3	9	TANK Check for leaks and excessive discoloration Check pump mounting block
4	10	PUMP Check to see that pump is correctly mounted to the tank Inspect pump control panel cover for cracks or other damage. The exterior surface should be clean, free of dust, dirt, and grease. Inspect the pump control for damage.
5	11	HARDWARE
6	12	HYPOCHLORINATION UNIT Inspect the entire unit for operational damage. Check each component for wear and damage.

STORAGE

13.21 Preparation of Equipment for Shipment

13.21.1 General. Detailed instructions for the preparation of the hypochlorination unit for domestic shipment are outlined in this section. Preservation will be accomplished in a sequence that will not require the operation of previously preserved components.

13.21.2 Inspection. The unit will be inspected for any unusual conditions, such as damage and pilferage. Inspection of individual components will be as outlined in the PMCS section of this chapter.

13.21.3 Cleaning and Drying.

13.21.3.1 Clean all surfaces of the hypochlorination unit with clean water and dry thoroughly.

13.21.3.2 Flush the unit with clean potable water.

13.21.3.3 Empty the tank by removing the drain plug and flush with fresh, potable water in accordance with local legal environmental requirements.

13.21.4 Depreservation Guide. The Depreservation Guid (DA Form 2258) is not applicable to this unit.

13.21.5 Power Cord. The power cord will be coiled and tied securely to the unit.

13.21.6 Discharge Tubing. The 25-foot discharge tubing will be coiled and securely tied to the unit.

13.21.7 Basic Issue Items. All basic issue items will be packed with the hypochlorination unit in the Water Distribution Set or Waste Water Augmentation Set MILVAN.

13.22 Loading Equipment for Shipment

The hypochlorination unit is not heavy, so one person can lift the unit into the MILVAN.

13.23 Preparation of Equipment for Limited Storage

13.23.1 The instructions contained in paragraph 13.21 apply. Limited storage is defined as storage not to exceed six months.

13.23.2 The hypochlorination units should be stored in the Water Distribution Set and the Waste Water Augmentation Set MILVANs.

13.24 Inspection and Maintenance of Equipment in Limited Storage

Every 90 days, the hypochlorination units must be inspected as outlined in "Preventive Maintenance Checks and Services (PMCS)-Organizational Maintenance", Table 13-5.

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OPERATOR AND MAINTAINER INSTRUCTIONS

HEATER, WATER, 9,000 WATTS
Definiance Electronics Incorporated
Model 11739

(NSN 4520-01-493-7423)

14.1 Introduction

This chapter is for your use in operating and maintaining the Heater, Water, 9,000 Watts.

14.2 Maintenance Forms and Records

Maintenance forms and records that you are required to use are explained in TM 38-750.

14.3 Equipment Serviceability Criteria (ESC)

This equipment is not covered by an ESC.

14.4 Description This item is designed to raise the ambient temperature in the potable water lines of the Water Distribution Set to prevent freezing of the water in the lines. It is not meant to produce hot water.

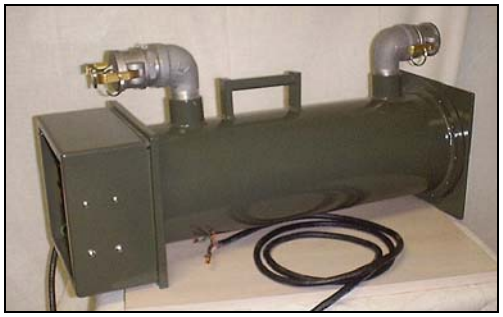

Figure 14-1
Heater, Water, 9,000 Watts

OPERATING INSTRUCTIONS

14.5 Operations of the Heater, Water

14.5.1 The instructions in this section are published for the information and guidance of the personnel responsible for the operation of the Heater, Water.

14.5.2 This section gives instructions for set-up, starting, and stopping the heaters, and operation of the unit.

14.6 Starting

14.6.1 Set-Up

14.6.1.1 The heater may be placed at any hose junction, however, the heaters should be spaced out evenly along the

primary and secondary potable water lines.

14.6.1.2 To install simply open the cam-lock fittings at any hose junction. The male end of the hose line will fit into the female port of the heater and the female end of the hose fitting will attach to the male port of the heater. Make sure the cam-locks are seated and locked securely. If installing the heater to the secondary (1-inch potable water line) use Reducer, Quick Disconnect (1-inch female to 1½-inch male) (NSN 4730-01-499-8687) between the hose and the input port of the heater and Reducer, Quick Disconnect (1½-inch female to 1-inch male) (NSN: 4730-01-499-8752) between the output port of the heater and the hose.

14.6.1.3 Plug the 40-foot power cable into a power outlet on the PDC.

14.6.2 Start-Up

Make sure the water is circulating. Turn on the power switch. The switch is lighted when the heater is on and the power is connected.

CAUTION
Never operate the heater without the water circulating. This could burn up the heater elements.

14.7 Shutdown

Switch unit off, and then disconnect power cord.

14.8 Cleaning Instructions

14.8.1 If the heater requires routine internal cleaning:

14.8.1.1 Switch heater off, and then disconnect power cord.

14.8.1.2 Disconnect the heater from the water line. Reconnect the water line ends to each other. Plug the female port of the heater with Plug, Quick Disconnect, 1½-inch (NSN: 4730-00-823-5316). Cap the male port of the heater with Cap, Quick Disconnect, 1½-inch (NSN: 4730-00-869-4256).
14.8.1.3 Remove the square tank end (manufacturer's part number PWH-011) (number 11 in figure 14.2).

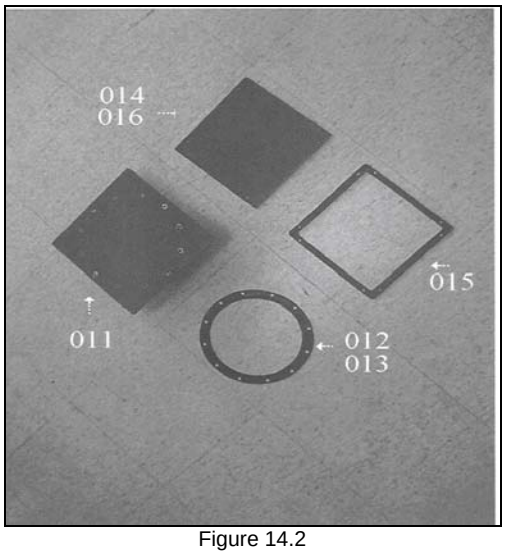

Figure 14.2
Heater Parts

14.8.1.4 Remove gasket (manufacturer's part number PWH-013) (number 13 in figure 14-2).

14.8.1.5 Clean interior.

14.8.1.6 Reassemble, using a new gasket.

14.8.1.7 Use the set-up procedures, outlined in paragraph 14,6,1, to reinstall heater into water line.

14.8.2 If the heater requires a more thorough cleaning:

14.8.2.1 Switch heater off, and then disconnect power cord.

14.8.2.2 Disconnect the heater from the water line. Reconnect the water line ends to each other. Plug the female port of the heater with Plug, Quick Disconnect, 1½-inch (NSN: 4730-00-823-5316). Cap the male port of the heater with Cap, Quick Disconnect, 1½-inch (NSN: 4730-00-869-4256).

14.8.2.3 Remove heater elements (items 003, figure 14.3) (manufacturer's part number PWH 003 [set of 6]).

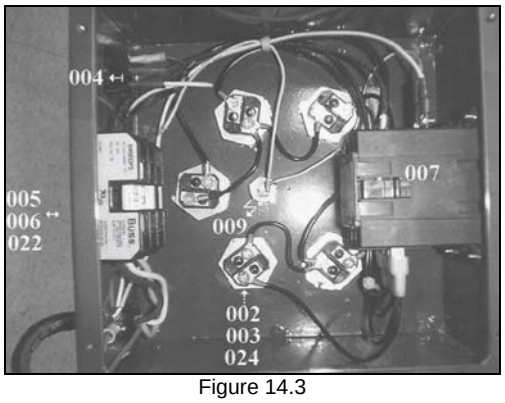

Figure 14.3
Heater, Control Interior

14.8.2.4 Remove the center support from heater barrel.

14.8.2.5 Clean interior and reassemble, using new gaskets (part number PWH 013, shown in figure 14.2) and six each heating element gaskets (part number PWH 024).

14.8.2.6 Use the set-up procedures, outlined in paragraph 14,6,1, to reinstall heater into water line.

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

SERVICE UPON RECEIPT OF UNIT

14.9 Inspecting and Servicing the Heater

14.9.1 Inspection

14.9.1.1 Make a complete visual inspection of the heater to assure that all accessories, attachments, publications, and required items have been delivered with the heater.

14.9.1.2 Inspect the heater for loss of parts or hardware.

14.9.2 Servicing the heater

14.9.2.1 The heater is shipped complete and ready for operation.

14.9.2.2 Perform the daily preventive maintenance checks and services (tables 14.1, 14.2 and 14.3).

Table 14.1 Preventive Maintenance Checks and Services (PMCS) – Before Operation

Sequence Number	Item to be Inspected Procedure
1	ELECTRICAL POWER CORD AND CONNECTIONS Inspect the power cord for breaks and frayed connections Check for loose connections
2	HEATER Inspect the heater for damage and leaks Check the on/off switch to verify that it moves easily Check to see that the water line hoses are connected to the heater securely and properly locked

Table 14.2 Preventive Maintenance Checks and Services (PMCS) – During Operation

Sequence Number	Item to be Inspected Procedure
1	HEATER Inspect the heater of operational damage and leaks
2	HEATER Clean the heater with clean, clear water, rinse and wipe dry

Table 14.3 Preventive Maintenance Checks and Services (PMCS) – After Operation

Sequence Number	Item to be Inspected Procedure
1	HEATER Inspect the heater for operational damage and leaks Inspect for dirt and foreign matter

WARNING
Use care – the heater may be hot to the touch, which could cause burns.
Let it cool down before service.

TROUBLESHOOTING

14.10 General

14.10.1 This section contains troubleshooting information for locating most of the operating trouble that may develop in the heater. Each malfunction is followed by a list of tests or inspections that will help you determine probable causes and corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

14.10.2 This manual cannot list all of the malfunctions that may occur, nor all of the tests or inspections and corrective actions. If a malfunction is not listed, or it is not corrected by the listed corrective actions, notify your supervisor.

NOTE
Before you use this table, be sure that you have performed all of the applicable operating checks.

Table 14.4 Troubleshooting

Malfunction
Test or Inspection
Corrective Action

1. HEATER FAILS TO FUNCTION PROPERLY - POWER

Step 1: Check for loose or corroded power cord connections
Tighten loose connections, clean corroded connection
Step 2: Check power source voltage
If the power source is too low, too high, or unbalanced, connect to a proper power source

2. HEATER FAILS TO FUNCTION PROPERLY – HEATS WATER

Step 1: Inspect water flow through heater
Disconnect input and output water lines
Examine lines for clogs or obstructions. If found, either clear or replace lines
Examine input and output ports of the heater for clogs or obstructions, if found, clear
Examine throughput of heater by tipping the heater on end and cycling water through it. If clogged, clean heater
Reconnect input and output hoses to heater
Step 2: Inspect placement of heaters in primary and secondary loop
Redistribute heaters as required
Step 3: Inspect and test heating elements
Replace heater elements

Table 14.4 Trouleshooting (continued)

Malfunction
Test or Inspection
Corrective Action

3. HEATER LEAKS

Step 1: Inspect input and output port and hose seals
If hoses are incorrectly installed, reinstall
If input and output port fittings are faulty, replace heater
Step 2: Inspect heater for leaks around heating elements
Tighten heater elements, or replace seals
Step 3: Inspect heater barrel
If leaking, replace heater

MOVEMENT TO A NEW SITE

14.11 Dismantling for Movement

14.11.1 Turn off heater with power switch.

14.11.2 Disconnect the power chord from the power source.

14.11.3 Disconnect the hose lines from the input and output ports.

14.11.4 Plug the 1½-inch female inlet port of the heater with Plug, Quick Disconnect, 1½-inch (NSN: 4730-00-823-5316). Cover the 1½-inch outlet port of the heater with Cap, Quick Disconnect, 1½-inch (NSN: 4730-00-869-5246) to prevent foreign material from entering the heater.

14.11.5 Coil and tie the power cord to the heater.

14.11.6 Pack the heaters in the Water Distribution Set or Waste Water Augmentation Set MILVAN, as applicable.

14.12 Reinstallation After Movement

Refer to paragraph 14.6.1 and reinstall the heater.

REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

14.13 Tools and Equipment

Organizational personnel for maintenance of this heater require no special tools or equipment. Basic tools will be used.

14.14 Organizational Maintenance Repair Parts

Repair parts for the heater are listed in the RPSTL portion of this manual.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

14.15 General

To ensure that the heater is ready for operations at all times, it must be systematically inspected so that defects may be discovered and corrected before they result in serious damage or failure. The recommended PMCS to be performed are listed in paragraph 14.16. All deficiencies and shortcoming will be recorded together with the corrective action taken on DA Form 2404 (Equipment Inspections and Maintenance Worksheet).

14.16 Preventive Maintenance Checks and Services (PMCS)

Refer to table 14.5 for applicable PMCS.

Table 14.5 Preventive Maintenance Checks and Services (PMCS) – Organizational Maintenance

M – Monthly Q – Quarterly

Interval Sequence No.		Item to be Inspected Procedure
M	Q	
1	5	APPEARANCE OF EQUIPMENT Clean entire heater with clean, clear water, rinse, and dry
2	6	ELECTRICAL LINES AND CONNECTIONS Inspect power cord for breaks and frayed insulation Check for loose connections

Table 14.5 Preventive Maintenance Checks and Services (PMCS) – Organizational Maintenance (continued)

M – Monthly Q – Quarterly

Interval Sequence No.		Item to be Inspected Procedure
M	Q	
3	7	HARDWARE
4	8	HEATER, WATER Inspect the entire heater for operational damage Check each component for wear and damage

STORAGE

14.17 Preparation of Equipment for Shipment

14.17.1 General. Detailed instructions for the preparation of the heater, water for domestic shipment are outlined in this section. Preservation will be accomplished in a sequence that will not require the operation of previously preserved components.

14.17.2 Inspection. The heater will be inspected for any unusual conditions, such as damage and pilferage. Inspection of individual components will be as outlined in the PMCS section of this chapter.

14.17.3 Cleaning and Drying

14.17.3.1 Clean all surfaces of the heater with clean water and dry thoroughly.

14.17.4 Empty the heater be removing the plug from the inlet port and the cap from the outlet port, and then tip the unit to drain the water from the heater barrel.

14.17.5 Replace the Plug, Quick Disconnect, 1½-inch (NSN: 4730-00-823-5316) on the female inlet port of the heater.

14.17.6 Replace the Cap, Quick Disconnect, 1½-inch, (NSN: 4730-00-869-5246) on the male outlet port of the heater.

14.17.3 Depreservation Guide. The Depreservation Guide (DA Form 2258) is not applicable to this heater.

14.17.4 Power Cord. The power chord will be coiled and tied securely to the transport handle of the heater.

14.18 Loading the Heater for Shipment

The heater is not heavy, so one person can lift it into the MILVAN. It comes with a handle for carrying.

14.19 Preparation of the Heater for Limited Storage

14.19. 1 The instructions in paragraph 14.17 apply. Limited storage is defined as storage not to exceed six months.

14.19.2 The heaters should be stored in the Water Distribution Set or the Waste Water Augmentation Set MILVANs, as appropriate.

14.20 Inspection and Maintenance of the Heaters in Limited Storage

Ever 90 days, the heaters must be inspected, as outlined in "Preventive Maintenance Checks and Services (PMCS) – Organizational Maintenance" Table 14.5.

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APPENDIX A

INVENTORY LISTS

WATER DISTRIBUTION SET, HOSPITAL, DEPMEDS
WASTE WATER MANAGEMENT SET, HOSPITAL DEPMEDS
WASTE WATER AUGMENTATION SET, HOSPITAL, DEPMEDS
WATER DISTRIBUTION AND WASTE WATER MANAGEMENT SYSTEM MAINTENANCE SET, HOSPITAL, DEPMEDS

WATER DISTRIBUTION SET (WDS), MF2K
2000 CONFIGURATION

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
3990	01-449-1997	13229E7185	Storage and Retrieval Materiel System	4	EA
4320	01-440-4421	13229E7159	Pump Assembly, Centrifugal	2	EA
4520	01-493-7423	111739	Heater, Water, 9,000 Watts	12	EA
4610	01-435-4884	WAL-1031-96	Hypochlorination Unit	1	EA
4610	01-440-4086	13229E7162	Pipe Assembly, Potable	1	AY
4610	01-440-4088	13229E7165	Pipe Assembly, Potable	2	AY
4610	01-440-4090	13229E7163	Indicator, Assembly	2	AY
4610	01-440-6834	13229E7168	Nozzle Assembly, Water	7	AY
4720	01-140-6288	13225E9136-4	Hose Assembly, Nonmetallic	2	EA
4720	01-175-5958	13225E9136-12	Hose Assembly, Nonmetallic	43	EA
4720	01-177-3714	13225E9136-13	Hose Assembly, Nonmetallic	37	EA
4720	01-438-7779	13225E9135-9	Hose Assembly, Nonmetallic	6	EA
4720	01-438-8335	13225E9136-18	Hose Assembly, Nonmetallic	2	EA
4720	01-438-8336	13225E9136-17	Hose Assembly, Nonmetallic	8	EA
4720	01-438-8337	13225E9136-15	Hose Assembly, Nonmetallic	15	EA
4720	01-438-8338	13225E9136-14	Hose Assembly, Nonmetallic	39	EA
4720	01-438-8341	13225E9136-10	Hose Assembly, Nonmetallic	26	EA
4720	01-438-8343	13225E9136-9	Hose Assembly, Nonmetallic	24	EA
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4730	01-186-0821	AA59326XI-1-10	Reducer, Quick Disconnect	1	EA
4730	01-415-6403	13229E7170	Plug, Quick Disconnect	30	EA
4730	01-415-6420	13229E7195	Adapter, Straight, Hose to Boss	30	EA
4730	01-440-4091	13229E0361	Tee Assembly, Quick Disconnect	32	EA
4730	01-440-4609	13229E7172	Tee Assembly, Quick Disconnect	18	AY
4730	01-440-4613	13229E7174	Tee Assembly, Quick Disconnect	18	AY
4730	01-440-4615	13229E7181	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4633	13229E7182	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4931	13230E5716	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4933	13230E5717	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4938	13230E5715	Tee Assembly, Quick Disconnect	2	AY
4730	01-440-7662	13229E7179	Strainer, Sediment	1	EA
4730	01-440-8569	13229E7173	Coupling Assembly, Quick Disconnect	16	EA
4730	01-445-5188	13229E7190	Adapter Assembly, Quick Disconnect	1	EA
4730	01-487-3575		Tee Assembly, Quick Disconnect	1	AY
4730	01-499-8687	3629	Reducer, Quick Disconnect	6	EA
4730	01-499-8752	3630	Reducer, Quick Disconnect	6	EA
4820	01-440-5919	13229E7197	Valve, Check	1	AY
4820	01-440-7798	13229E7167	Valve, Gate	52	EA
4820	01-440-8302	13229E7177	Valve, Gate	5	EA
4820	01-440-8306	13229E7178	Valve, Gate	5	EA
4820	01-440-8765	13229E7169	Valve, Globe	4	EA
4930	01-120-7426	13225E9140	Stand Assembly, Distribution Nozzle	7	EA
4940	01-449-3850	13229E7186	Reel Assembly, Hose	15	EA

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
6625	01-449-2857	13229E7189	Case, Electrical-Electronic Test	1	EA
6630	01-044-0334	U25377	Comparator, Color	1	EA
7240	00-089-3827	MIL-C-43613	Can, Water, Military	1	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	NSN	LIN	Description	QTY	U/M
5430	01-406-0507	T12938	Tank Assembly, Fabric Collaspible	1	EA
8115	01-241-7524	C13825	Container, Cargo	1	EA

WATER DISTRIBUTION SET (WDS), MF2K
2002 CONFIGURATION

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
3990	01-505-5922		Cage, Wire, Folding	19	EA
4320	01-440-4421	13229E7159	Pump Assembly, Centrifugal	2	EA
4520	01-493-7423	111739	Heater, Water, 9,000 Watts	12	EA
4610	01-435-4884	WAL-1031-96	Hypochlorination Unit	1	EA
4610	01-440-4086	13229E7162	Pipe Assembly, Potable	1	AY
4610	01-440-4088	13229E7165	Pipe Assembly, Potable	2	AY
4610	01-440-4090	13229E7163	Indicator, Assembly	2	AY
4610	01-440-6834	13229E7168	Nozzle Assembly, Water	7	AY
4720	01-140-6288	13225E9136-4	Hose Assembly, Nonmetallic	2	EA
4720	01-175-5958	13225E9136-12	Hose Assembly, Nonmetallic	43	EA
4720	01-177-3714	13225E9136-13	Hose Assembly, Nonmetallic	37	EA
4720	01-438-7779	13225E9135-9	Hose Assembly, Nonmetallic	6	EA
4720	01-438-8335	13225E9136-18	Hose Assembly, Nonmetallic	2	EA
4720	01-438-8336	13225E9136-17	Hose Assembly, Nonmetallic	8	EA
4720	01-438-8337	13225E9136-15	Hose Assembly, Nonmetallic	15	EA
4720	01-438-8338	13225E9136-14	Hose Assembly, Nonmetallic	39	EA
4720	01-438-8341	13225E9136-10	Hose Assembly, Nonmetallic	26	EA
4720	01-438-8343	13225E9136-9	Hose Assembly, Nonmetallic	24	EA
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4730	01-186-0821	AA59326XI-1-10	Reducer, Quick Disconnect	1	EA
4730	01-415-6403	13229E7170	Plug, Quick Disconnect	30	EA
4730	01-415-6420	13229E7195	Adapter, Straight, Hose to Boss	30	EA
4730	01-440-4091	13229E0361	Tee Assembly, Quick Disconnect	32	EA
4730	01-440-4609	13229E7172	Tee Assembly, Quick Disconnect	18	AY
4730	01-440-4613	13229E7174	Tee Assembly, Quick Disconnect	18	AY
4730	01-440-4615	13229E7181	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4633	13229E7182	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4931	13230E5716	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4933	13230E5717	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4938	13230E5715	Tee Assembly, Quick Disconnect	2	AY
4730	01-440-7662	13229E7179	Strainer, Sediment	1	EA
4730	01-440-8569	13229E7173	Coupling Assembly, Quick Disconnect	16	EA
4730	01-445-5188	13229E7190	Adapter Assembly, Quick Disconnect	1	EA
4730	01-487-3575	4730NCM010315	Tee Assembly, Quick Disconnect	1	AY
4730	01-499-8687	3629	Reducer, Quick Disconnect	6	EA
4730	01-499-8752	3630	Reducer, Quick Disconnect	6	EA
4820	01-440-5919	13229E7197	Valve, Check	1	AY
4820	01-440-7798	13229E7167	Valve, Gate	52	EA
4820	01-440-8302	13229E7177	Valve, Gate	5	EA
4820	01-440-8306	13229E7178	Valve, Gate	5	EA
4820	01-440-8765	13229E7169	Valve, Globe	4	EA
4930	01-120-7426	13225E9140	Stand Assembly, Distribution Nozzle	7	EA

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
6625	01-449-2857	13229E7189	Case, Electrical-Electronic Test	1	EA
6630	01-044-0334	U25377	Comparator, Color	1	EA
7240	00-089-3827	MIL-C-43613	Can, Water, Military	1	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	NIIN	LIN	Description	QTY	U/M
5430	01-406-0507	T12938	Tank Assembly, Fabric Collaspible	1	EA
8115	01-241-7524	C13825	Container, Cargo	1	EA

WATER DISTRIBUTION SET (WDS), MF2K
2003 CONFIGURATION

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
3990	01-505-5922		Cage, Wire, Folding	19	EA
4320	01-506-4459	13229E7159	Pump Assembly, Centrifugal	2	EA
4520	01-493-7423	111739	Heater, Water, 9,000 Watts	12	EA
4610	01-435-4884	WAL-1031-96	Hypochlorination Unit	1	EA
4610	01-440-4086	13229E7162	Pipe Assembly, Potable	1	AY
4610	01-440-4088	13229E7165	Pipe Assembly, Potable	2	AY
4610	01-440-4090	13229E7163	Indicator, Assembly	2	AY
4610	01-440-6834	13229E7168	Nozzle Assembly, Water	7	AY
4720	01-140-6288	13225E9136-4	Hose Assembly, Nonmetallic	2	EA
4720	01-175-5958	13225E9136-12	Hose Assembly, Nonmetallic	43	EA
4720	01-177-3714	13225E9136-13	Hose Assembly, Nonmetallic	37	EA
4720	01-438-7779	13225E9135-9	Hose Assembly, Nonmetallic	6	EA
4720	01-438-8335	13225E9136-18	Hose Assembly, Nonmetallic	2	EA
4720	01-438-8336	13225E9136-17	Hose Assembly, Nonmetallic	8	EA
4720	01-438-8337	13225E9136-15	Hose Assembly, Nonmetallic	15	EA
4720	01-438-8338	13225E9136-14	Hose Assembly, Nonmetallic	39	EA
4720	01-438-8341	13225E9136-10	Hose Assembly, Nonmetallic	26	EA
4720	01-438-8343	13225E9136-9	Hose Assembly, Nonmetallic	24	EA
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4730	01-186-0821	AA59326XI-1-10	Reducer, Quick Disconnect	1	EA
4730	01-415-6403	13229E7170	Plug, Quick Disconnect	30	EA
4730	01-415-6420	13229E7195	Adapter, Straight, Hose to Boss	30	EA
4730	01-440-4091	13229E0361	Tee Assembly, Quick Disconnect	32	EA
4730	01-440-4609	13229E7172	Tee Assembly, Quick Disconnect	18	AY
4730	01-440-4613	13229E7174	Tee Assembly, Quick Disconnect	18	AY
4730	01-440-4615	13229E7181	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4633	13229E7182	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4931	13230E5716	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4933	13230E5717	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4938	13230E5715	Tee Assembly, Quick Disconnect	2	AY
4730	01-440-7662	13229E7179	Strainer, Sediment	1	EA
4730	01-440-8569	13229E7173	Coupling Assembly, Quick Disconnect	16	EA
4730	01-445-5188	13229E7190	Adapter Assembly, Quick Disconnect	1	EA
4730	01-487-3575	4730NCM010315	Tee Assembly, Quick Disconnect	1	AY
4730	01-499-8687	3629	Reducer, Quick Disconnect	6	EA
4730	01-499-8752	3630	Reducer, Quick Disconnect	6	EA
4820	01-440-5919	13229E7197	Valve, Check	1	AY
4820	01-440-7798	13229E7167	Valve, Gate	52	EA
4820	01-440-8302	13229E7177	Valve, Gate	5	EA
4820	01-440-8306	13229E7178	Valve, Gate	5	EA
4820	01-440-8765	13229E7169	Valve, Globe	4	EA
4930	01-120-7426	13225E9140	Stand Assembly, Distribution Nozzle	7	EA

NSN					
FSC	**NIIN**	**P/N**	**Description**	**QTY**	**U/M**
6625	01-449-2857	13229E7189	Case, Electrical-Electronic Test	1	EA
6630	01-044-0334	U25377	Comparator, Color	1	EA
7240	00-089-3827	MIL-C-43613	Can, Water, Military	1	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	**NIIN**	**LIN**	**Description**	**QTY**	**U/M**
5430	01-406-0507	T12938	Tank Assembly, Fabric Collaspible	1	EA
8115	01-241-7524	C13825	Container, Cargo	1	EA

WASTEWATER MANAGEMENT SET (WWMS), MF2K
2000 CONFIGURATION

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
3990	01-449-1997	13229E7185-2	Storage and Retrieval System Materiel	1	EA
4320	01-440-7388	13229E7222	Pump Assembly, Diaphram	3	EA
4720	01-434-9594	13229E7223-2	Hose Assembly, Rubber	48	EA
4720	01-434-9605	13229E7223-3	Hose Assembly, Rubber	72	EA
4720	01-434-9627	13229E7226	Hose Assembly, Rubber	34	EA
4720	01-434-9638	13230E5746-4	Hose Assembly, Rubber	6	EA
4720	01-434-9646	13229E7223-1	Hose Assembly, Rubber	22	EA
4720	01-434-9649	13229E7223-4	Hose Assembly, Rubber	17	EA
4730	00-496-5952	WW-C-633-M	Wye, Quick Disconnect	48	EA
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4730	01-186-0821	AA59326XI-1-10	Reducer, Quick Disconnect	1	EA
4820	01-440-5916	13225E7225	Valve, Ball	2	EA
4930	01-120-7426	13225E9140	Stand Assembly, Distribution Nozzle	2	EA
4940	01-434-9587	13229E7186-2	Reel Assembly, Hose	15	EA
4940	01-449-3840	13229E7186-1	Reel Assembly, Hose	2	EA
6545	01-434-9587	13229E7229	Funnel Assembly	2	EA
6545	01-434-9630	13229E7224	Adapter, Sink	16	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	NIIN	LIN	Description	QTY	U/M
5430	01-241-7524	C13825	Container, Cargo	1	EA
8115	01-406-0507	T12938	Tank Assembly, Fabric Collaspible	1	EA

WASTEWATER MANAGEMENT SET (WWMS), MF2K
2002 CONFIGURATION

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
3990	01-505-5922		Cage, Wire, Folding	16	EA
4320	01-440-7388	13229E7222	Pump Assembly, Diaphram	3	EA
4720	01-434-9594	13229E7223-2	Hose Assembly, Rubber	48	EA
4720	01-434-9605	13229E7223-3	Hose Assembly, Rubber	72	EA
4720	01-434-9627	13229E7226	Hose Assembly, Rubber	34	EA
4720	01-434-9638	13230E5746-4	Hose Assembly, Rubber	6	EA
4720	01-434-9646	13229E7223-1	Hose Assembly, Rubber	22	EA
4720	01-434-9649	13229E7223-4	Hose Assembly, Rubber	17	EA
4730	00-496-5952	WW-C-633-M	Wye, Quick Disconnect	48	EA
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4730	01-186-0821	AA59326XI-1-10	Reducer, Quick Disconnect	1	EA
4820	01-440-5916	13225E7225	Valve, Ball	2	EA
4930	01-120-7426	13225E9140	Stand Assembly, Distribution Nozzle	2	EA
6545	01-434-9587	13229E7229	Funnel Assembly	2	EA
6545	01-434-9630	$13229^{E}7224$	Adapter, Sink	16	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	NIIN	LIN	Description	QTY	U/M
5430	01-241-7524	C13825	Container, Cargo	1	EA
8115	01-406-0507	T12938	Tank Assembly, Fabric Collaspible	1	EA

WASTE-WATER AUGMENTATION SET (WWAS), MF2K
2000 CONFIGURATION

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
3990	01-449-1997	13229E7185	Storage and Retrieval Materiel System	4	EA
4320	01-440-4421	13229E7159	Pump Assembly, Centrifugal	1	EA
4610	01-435-4884	WAL-1031-96	Hypochlorination Unit	1	EA
4610	01-440-4086	13229E7162	Pipe Assembly, Potable	1	AY
4610	01-440-4088	13229E7165	Pipe Assembly, Potable	1	AY
4610	01-440-4090	13229E7163	Indicator, Assembly	1	AY
4610	01-440-6834	13229E7168	Nozzle Assembly, Water	1	AY
4710	00-057-7252	MIL-P-236	Pipe , Culvert, Metallic	8	EA
4720	01-140-6288	13225E9136-4	Hose Assembly, Nonmetallic	1	EA
4720	01-175-5958	13225E9136-12	Hose Assembly, Nonmetallic	5	EA
4720	01-177-3714	13225E9136-13	Hose Assembly, Nonmetallic	10	EA
4720	01-434-9594	13229E7223-2	Hose Assembly, Rubber	4	EA
4720	01-434-9605	13229E7223-3	Hose Assembly, Rubber	10	EA
4720	01-434-9627	13229E7226	Hose Assembly, Rubber	5	EA
4720	01-434-9638	13230E5746-4	Hose Assembly, Rubber	1	EA
4720	01-434-9646	13229E7223-1	Hose Assembly, Rubber	8	EA
4720	01-434-9649	13229E7223-4	Hose Assembly, Rubber	2	EA
4720	01-438-7779	13225E9135-9	Hose Assembly, Nonmetallic	1	EA
4720	01-438-8336	13225E9136-17	Hose Assembly, Nonmetallic	1	EA
4720	01-438-8337	13225E9136-15	Hose Assembly, Nonmetallic	2	EA
4720	01-438-8338	13225E9136-14	Hose Assembly, Nonmetallic	5	EA
4720	01-438-8341	13225E9136-10	Hose Assembly, Nonmetallic	2	EA
4720	01-438-8343	13225E9136-9	Hose Assembly, Nonmetallic	3	EA
4720	01-440-4925	13229E7176	Channel, Hose Protector	10	AY
4720	01-440-4928	13229E7175	Channel, Hose Protector	5	EA
4730	00-496-5952	WW-C-633-M	Wye, Quick Disconnect	10	EA
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4730	01-186-0821	AA59326XI-1-10	Reducer, Quick Disconnect	1	EA
4730	01-415-6403	13229E7170	Plug, Quick Disconnect	4	EA
4730	01-415-6420	13229E7195	Adapter, Straight, Hose to Boss	4	EA
4730	01-440-4609	13229E7172	Tee Assembly, Quick Disconnect	2	EA
4730	01-440-4614	354 0910	Nipple, Pipe	4	EA
4730	01-440-4615	13229E7181	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4633	13229E7182	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-7662	13229E7179	Strainer, Sediment	1	EA
4730	01-440-8569	13229E7173	Coupling Assembly, Quick Disconnect	3	EA
4730	01-487-3575	13229E7174	Tee Assembly, Quick Disconnect	1	EA
4820	01-440-5916	13225E7225	Valve, Ball	1	EA
4820	01-440-5919	13229E7197	Valve, Check	1	AY
4820	01-440-7798	13229E7167	Valve, Gate	4	EA
4820	01-440-8302	13229E7177	Valve, Gate	1	EA
4820	01-440-8306	13229E7178	Valve, Gate	1	EA
4820	01-440-8309	13229E7196	Valve, Gate	1	EA

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
4820	01-440-8765	13229E7169	Valve, Globe	1	EA
4940	01-449-3840	13229E7186-1	Reel Assembly, Hose	2	EA
4940	01-449-3850	13229E7186	Reel Assembly, Hose	15	EA
5985	01-392-9111	AL2423-09-4	Case, Meter and Gauge	1	EA
6545	01-434-9630	13229E7224	Adapter, Sink	4	EA
6545	01-440-7388	13229E7222	Pump Assembly, Reciprocating	1	EA
6630	01-044-0334	U25377	Comparator, Color	1	EA
7240	00-089-3827	MIL-C-43613	Can, Water, Military	1	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	NIIN	LIN	Description	QTY	U/M
5430	01-170-6984	T19033	Tank Assembly, Fabric Collaspible	2	EA
8115	01-241-7524	C13825	Container, Cargo	1	EA

WASTE-WATER AUGMENTATION SET (WWAS), MF2K
2002 CONFIGURATION

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
4320	01-506-4459	13229E7159	Pump Assembly, Centrifugal	1	EA
4610	01-435-4884	WAL-1031-96	Hypochlorination Unit	1	EA
4610	01-440-4086	13229E7162	Pipe Assembly, Potable	1	AY
4610	01-440-4088	13229E7165	Pipe Assembly, Potable	1	AY
4610	01-440-4090	13229E7163	Indicator, Assembly	1	AY
4610	01-440-7388	13229E7222	Pump Assembly, Reciprocating	1	EA
4710	00-057-7252	MIL-P-236	Pipe , Culvert, Metallic	8	EA
4720	01-140-6288	13225E9136-4	Hose Assembly, Nonmetallic	1	EA
4720	01-175-5958	13225E9136-12	Hose Assembly, Nonmetallic	5	EA
4720	01-177-3714	13225E9136-13	Hose Assembly, Nonmetallic	10	EA
4720	01-434-9594	13229E7223-2	Hose Assembly, Rubber	4	EA
4720	01-434-9605	13229E7223-3	Hose Assembly, Rubber	10	EA
4720	01-434-9627	13229E7226	Hose Assembly, Rubber	5	EA
4720	01-434-9638	13230E5746-4	Hose Assembly, Rubber	1	EA
4720	01-434-9646	13229E7223-1	Hose Assembly, Rubber	8	EA
4720	01-434-9649	13229E7223-4	Hose Assembly, Rubber	2	EA
4720	01-438-7779	13225E9135-9	Hose Assembly, Nonmetallic	1	EA
4720	01-438-8336	13225E9136-17	Hose Assembly, Nonmetallic	1	EA
4720	01-438-8337	13225E9136-15	Hose Assembly, Nonmetallic	2	EA
4720	01-438-8338	13225E9136-14	Hose Assembly, Nonmetallic	5	EA
4720	01-438-8341	13225E9136-10	Hose Assembly, Nonmetallic	2	EA
4720	01-438-8343	13225E9136-9	Hose Assembly, Nonmetallic	3	EA
4720	01-440-4928	13229E7175	Channel, Hose Protector	5	EA
4720	01-440-5916	13225E7225	Valve, Ball	1	EA
4730	00-496-5952	WW-C-633-M	Wye, Quick Disconnect	10	EA
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4730	01-186-0821	AA59326XI-1-10	Reducer, Quick Disconnect	1	EA
4730	01-415-6403	13229E7170	Plug, Quick Disconnect	4	EA
4730	01-415-6420	13229E7195	Adapter, Straight, Hose to Boss	4	EA
4730	01-440-4614	354 0910	Nipple, Pipe	4	EA
4730	01-440-4615	13229E7181	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4633	13229E7182	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4925	13229E7176	Channel, Hose Protector	10	AY
4730	01-440-7798	13229E7167	Valve, Gate	4	EA
4730	01-440-8765	13229E7169	Valve, Globe	1	EA
4730	01-505-5922		Cage, Wire, Folding	5	EA
4820	01-440-5919	13229E7197	Valve, Check	1	AY
4820	01-440-6834	13229E7168	Nozzle Assembly, Water	1	AY
4820	01-440-8302	13229E7177	Valve, Gate	1	EA
4820	01-440-8306	13229E7178	Valve, Gate	1	EA
4820	01-440-8309	13229E7196	Valve, Gate	1	EA
4820	01-440-8569	13229E7173	Coupling Assembly, Quick Disconnect	3	EA
4820	01-487-3575	13229E7174	Tee Assembly, Quick Disconnect	1	EA

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
5430	01-440-4609	13229E7172	Tee Assembly, Quick Disconnect	2	EA
5985	01-392-9111	AL2423-09-4	Case, Meter and Gauge	1	EA
6545	01-434-9630	13229E7224	Adapter, Sink	4	EA
6545	01-440-7662	13229E7179	Strainer, Sediment	1	EA
6630	01-044-0334	U25377	Comparator, Color	1	EA
7240	00-089-3827	MIL-C-43613	Can, Water, Military	1	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	NIIN	LIN	Description	QTY	U/M
5430	01-170-6984	T19033	Tank Assembly, Fabric Collaspible	2	EA
8115	01-241-7524	C13825	Container, Cargo	1	EA

MAINTENANCE SET (WDWWMSMS)

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
4010	00-228-9948	RR-C-271	Chain, Weldless	1	BX
4030	00-780-9350	MS87006-13	Hook, Chain	1	HD
4720	00-200-0361	ZZ-H-601	Hose Nonmetalic	100	FT
4720	00-876-8903	J-409	Clamp, Hose	2	EA
4720	01-392-2299	ZZ-H-601	Hose Nonmetalic	50	FT
4730	00-088-4298	AWR14	Seal	5	EA
4730	00-360-0592	MS27021-9	Coupling, Half, Quick Disconnect	4	EA
4730	00-360-0715	A-A-59326/11	Plug, Quick Disconnect	5	EA
4730	00-496-5953	AM-11	Coupling, Half, Quick Disconnect	4	EA
4730	00-823-5316	A-A-59326-11	Plug, Quick Disconnect	4	EA
4730	00-869-5246	MS27028-9	Cap, Quick Disconnect	4	EA
4730	00-909-8627	A-A-52506	Clamp, Hose	100	EA
4730	00-929-0791	MS27028-5	Cap, Quick Disconnect	5	EA
4730	00-948-1722	A-A-59326-6	Coupling, Half, Quick Disconnect	4	EA
4730	01-007-9254	J 405	Clamp, Hose	20	EA
4730	01-164-9254	MS27021-5	Coupling, Half, Quick Disconnect	5	EA
4730	01-222-0943	WW-C-633	Coupling, Half, Quick Disconnect	2	EA
4730	01-223-4931	MS27025-5	Coupling, Half, Quick Disconnect	5	EA
4930	00-253-2478	MIL-G-3859	Lubricating Gun, Hand	1	EA
5110	00-234-6534	A-A-2311	File, Hand	1	EA
5110	00-241-9151	A-A-2312	File, Hand	1	EA
5110	00-263-0349	NN-H-00106	Handle, File	2	EA
5110	00-277-4590	GGG-B-451	Blade, Hand Hacksaw	1	BD
5110	00-289-9657	A-A-453	Frame, Hand Hacksaw	1	EA
5120	00-010-7916	B107.15	Screwdriver, Flat Tip	1	EA
5120	00-061-8545	A-A-1305	Hammer, Hand	1	EA
5120	00-223-7397	B107.23M	Pliers, Slip Joint	1	EA
5120	00-277-1479	GGG-W-651	Wrench, Pipe	2	EA
5140	00-498-8772	CH77	Tool Box, Portable	3	EA
5325	00-926-5411	H01434M	Ring, Retaining	30	EA
5330	00-088-9167	MS27030-3	Gasket	25	EA
5330	00-360-0595	H064330M	Gasket	20	EA
5330	00-612-2414	H7388M	Gasket	4	EA
5330	00-741-7728	MIL-P-11719	Packing, Preformed	20	EA
5330	00-899-4509	H6476M	Gasket	10	EA
5330	01-141-1864	13220E1069-1	Gasket	10	EA
6810	01-358-4336	13229E0923	Sodium, Hypochlorite Technical	6	BG
7510	00-074-5124	A-A-1586	Tape, Pressure Sensitive, Adh	2	RO
8030	00-889-3534	A-A-58092	Tape, Antisiezing	25	EA
9150	01-226-4315	Pacesetter EP-65	Grease, General Purpose	3	TU

APPENDIX B

INVENTORY LISTS

WATER DISTRIBUTION SET, HOSPITAL, MRI 84 BED
WASTE WATER MANAGEMENT SET, HOSPITAL MRI 84 BED
WATER DISTRIBUTION AND WASTEWATER MANAGEMENT SYSTEM MAINTENANCE SET, HOSPITAL, MRI 84 BED
WATER CONNECTION SET

WATER DISTRIBUTION SET, HOSPITAL, MRI 84 BED

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
3990	01-505-5922	W-2-404-836-SP-SJF	Cage, Wire, Folding	7	EA
4320	01-506-4459	13229E7159	Pump Assembly, Centrifugal	2	EA
4520	01-492-7423	111739	Heater, Water, 9,000 Watts	6	EA
4610	01-435-4884	WAL-1031-96	Hypochlorination Unit	1	EA
4610	01-440-4086	13229E7162	Pipe Assembly, Potable	1	AY
4610	01-440-4088	13229E7165	Pipe Assembly, Potable	1	AY
4610	01-440-4090	13229E7163	Indicator, Assembly	1	AY
4610	01-440-6834	13229E7168	Nozzle Assembly, Water	3	AY
4720	01-175-5958	13225E9136-12	Hose Assembly, Nonmetallic	17	EA
4720	01-177-3714	13225E9136-13	Hose Assembly, Nonmetallic	14	EA
4720	01-438-7779	13225E9135-9	Hose Assembly, Nonmetallic	1	EA
4720	01-438-8335	13225E9136-18	Hose Assembly, Nonmetallic	2	EA
4720	01-438-8336	13225E9136-17	Hose Assembly, Nonmetallic	2	EA
4720	01-438-8337	13225E9136-15	Hose Assembly, Nonmetallic	5	EA
4720	01-438-8338	13225E9136-14	Hose Assembly, Nonmetallic	13	EA
4720	01-438-8341	13225E9136-10	Hose Assembly, Nonmetallic	20	EA
4720	01-438-8343	13225E9136-9	Hose Assembly, Nonmetallic	6	EA
4720	01-440-4925	13229E7176	Channel, Hose Protector	7	AY
4720	01-440-4928	13229E7175	Channel, Hose Protector	2	EA
4730	01-415-6403	13229E7170	Plug, Quick Disconnect	16	EA
4730	01-415-6420	13229E7195	Adapter, Straight, Hose to Boss	16	EA
4730	01-440-4091	13229E0361	Tee Assembly, Quick Disconnect	20	EA
4730	01-440-4609	13229E7172	Tee Assembly, Quick Disconnect	10	EA
4730	01-440-4613	13229E7174	Tee Assembly, Quick Disconnect	6	AY
4730	01-440-4615	13229E7181	Tee Assembly, Quick Disconnect	4	AY
4730	01-440-7662	13229E7179	Strainer, Sediment	1	EA
4730	01-440-8569	13229E7173	Coupling Assembly, Quick Disconnect	13	EA
4730	01-487-3575	13229E7174	Tee Assembly, Quick Disconnect	1	EA
4730	01-499-8687	3629	Reducer, Quick Disconnect	4	EA
4730	01-499-8752	3630	Reducer, Quick Disconnect	4	EA
4820	01-440-5919	13229E7197	Valve, Check	1	AY
4820	01-440-7798	13229E7167	Valve, Gate	21	EA
4820	01-440-8302	13229E7177	Valve, Gate	3	EA
4820	01-440-8306	13229E7178	Valve, Gate	3	EA
4820	01-440-8765	13229E7169	Valve, Globe	1	EA
4930	01-120-7426	13225E9140	Stand Assembly, Distribution Nozzle	3	EA
6545	01-499-5676	02-1038	Case, Medical, Supply and Instrument	1	EA
6630	01-044-0334	U25377	Comparator, Color	1	EA
7240	00-089-3827	MIL-C-43613	Can, Water, Military	1	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	**NIIN**	**P/N**	**Description**	**QTY**	**U/M**
5430	01-506-1999	T15154	Tank Assembly, Fabric Collaspible	1	EA
8115	01-241-7524	C13825	Container, Cargo	1	EA

WASTEWATER MANAGEMENT SET, HOSPITAL MRI 84 BED

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
3990	01-505-5922	W-2-404-836-SP-SJF	Cage, Wire, Folding	8	EA
4320	01-440-7388	13229E7222	Pump Assembly, Diaphragm	2	EA
4720	01-434-9594	13229E7223-2	Hose Assembly, Rubber	16	EA
4720	01-434-9605	13229E7223-3	Hose Assembly, Rubber	24	EA
4720	01-434-9627	13229E7226	Hose Assembly, Rubber	16	EA
4720	01-434-9638	13230E5746-4	Hose Assembly, Rubber	2	EA
4720	01-434-9646	13229E7223-1	Hose Assembly, Rubber	10	EA
4720	01-434-9649	13229E7223-4	Hose Assembly, Rubber	2	EA
4720	01-440-4925	13229E7176	Channel, Hose Protector	2	AY
4730	00-496-5952	WW-C-633-M	Wye, Quick Disconnect	16	EA
4820	01-440-5916	13225E7225	Valve, Ball	2	EA
4930	01-120-7426	13225E9140	Stand Assembly, Distribution Nozzle	2	EA
6545	01-434-9587	13229E7229	Funnel Assembly	2	EA
6545	01-434-9630	13229E7224	Adapter, Sink	11	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	NIIN	LIN	Description	QTY	U/M
5430	01-506-1999	T15154	Tank Assembly, Fabric Collaspible	1	EA
8115	01-241-7524	C13825	Container, Cargo	1	EA

WATER DISTRIBUTION AND WASTEWATER MANAGEMENT SYSTEM MAINTENANCE SET, HOSPITAL, MRI 84 BED

NSN					
FSC	**NIIN**	**P/N**	**Description**	**QTY**	**U/M**
4010	00-228-9948	RR-C-271	Chain, Weldless	1	BX
4030	00-780-9350	MS87006-13	Hook, Chain	1	HD
4720	00-200-0361	ZZ-H-601	Hose Nonmetalic	50	FT
4720	00-876-8903	J-409	Clamp, Hose	2	EA
4720	01-392-2299	ZZ-H-601	Hose Nonmetalic	20	FT
4730	00-909-8627	A-A-52506	Clamp, Hose	50	EA
4730	01-007-9254	J 405	Clamp, Hose	20	EA
4930	00-253-2478	MIL-G-3859	Lubricating Gun, Hand	1	EA
5110	00-234-6534	A-A-2311	File, Hand	1	EA
5110	00-241-9151	A-A-2312	File, Hand	1	EA
5110	00-263-0349	NN-H-00106	Handle, File	2	EA
5110	00-277-4590	GGG-B-451	Blade, Hand Hacksaw	1	BD
5110	00-289-9657	A-A-453	Frame, Hand Hacksaw	1	EA
5120	00-010-7916	B107.15	Screwdriver, Flat Tip	1	EA
5120	00-061-8545	A-A-1305	Hammer, Hand	1	EA
5120	00-223-7397	B107.23M	Pliers, Slip Joint	1	EA
5120	00-277-1479	GGG-W-651	Wrench, Pipe	2	EA
5140	00-498-8772	CH77	Tool Box, Portable	3	EA
5325	00-926-5411	H01434M	Ring, Retaining	30	EA
5330	00-088-9167	MS27030-3	Gasket	25	EA
5330	00-360-0595	H064330M	Gasket	20	EA
5330	00-612-2414	H7388M	Gasket	2	EA
5330	00-741-7728	MIL-P-11719	Packing, Preformed	10	EA
6810	01-358-4336	13229E0923	Sodium, Hypochlorite Technical	6	BG
7510	00-074-5124	A-A-1586	Tape, Pressure Sensitive, Adh	2	RO
8030	00-889-3534	A-A-58092	Tape, Antisiezing	25	EA
9150	01-226-4315	Pacesetter EP-65	Grease, General Purpose	3	TU

WATER CONNECTION SET
(Notational)

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
3990	01-505-5922	W-2-404-836-SP-SJF	Cage, Wire, Folding	3	EA
4720	01-438-8335	13225E9136-18	Hose Assembly, Nonmetallic	10	EA
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4820	01-440-8306	13229E7178	Valve, Gate	1	EA

APPENDIX C

INVENTORY LISTS

WATER DISTRIBUTION SET, HOSPITAL, MRI 164 BED
WASTE WATER MANAGEMENT SET, HOSPITAL MRI 164 BED
WATER DISTRIBUTION AND WASTEWATER MANAGEMENT SYSTEM MAINTENANCE SET, HOSPITAL, MRI 164 BED

Water Distribution Set, Hospital, MRI 164 Bed

NSN					
FSC	NIIN	LIN	Description	QTY	U/M
3990	01-505-5922	W-2-404-836-SP-SJF	Cage, Wire, Folding	13	EA
4320	01-506-4459	13229E7159	Pump Assembly, Centrifugal	3	EA
4520	01-493-7423	111739	Heater, Water, Electric	8	EA
4610	01-435-4884	WAL-1031-96	Hypochlorination Unit	1	EA
4610	01-440-4086	13229E7162	Pipe Assembly, Potable	1	AY
4610	01-440-4088	13229E7165	Pipe Assembly, Potable	1	AY
4610	01-440-4090	13229E7163	Indicator, Assembly	1	AY
4610	01-440-6834	13229E7168	Nozzle Assembly, Water	4	AY
4720	01-140-6288	13225E9136-4	Hose Assembly, Nonmetallic	2	EA
4720	01-175-5958	13225E9136-12	Hose Assembly, Nonmetallic	26	EA
4720	01-177-3714	13225E9136-13	Hose Assembly, Nonmetallic	21	EA
4720	01-438-7779	13225E9135-9	Hose Assembly, Nonmetallic	11	EA
4720	01-438-8335	13225E9136-18	Hose Assembly, Nonmetallic	7	EA
4720	01-438-8336	13225E9136-17	Hose Assembly, Nonmetallic	6	EA
4720	01-438-8337	13225E9136-15	Hose Assembly, Nonmetallic	10	EA
4720	01-438-8338	13225E9136-14	Hose Assembly, Nonmetallic	26	EA
4720	01-438-8341	13225E9136-10	Hose Assembly, Nonmetallic	20	EA
4720	01-438-8343	13225E9136-9	Hose Assembly, Nonmetallic	18	EA
4720	01-440-4925	13229E7176	Channel, Hose Protector	8	AY
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4730	01-186-0821	AA59326XI-1-10	Reducer, Quick Disconnect	1	EA
4730	01-415-6403	13229E7170	Plug, Quick Disconnect	17	EA
4730	01-415-6420	13229E7195	Adapter, Straight, Hose to Boss	17	EA
4730	01-440-4091	13229E0361	Tee Assembly, Quick Disconnect	12	EA
4730	01-440-4609	13229E7172	Tee Assembly, Quick Disconnect	17	AY
4730	01-440-4613	13229E7174	Tee Assembly, Quick Disconnect	12	AY
4730	01-440-4633	13229E7182	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-4931	13230E5716	Tee Assembly, Quick Disconnect	1	AY
4730	01-440-7662	13229E7179	Strainer, Sediment	1	EA
4730	01-440-8569	13229E7173	Coupling Assembly, Quick Disconnect	11	EA
4730	01-445-5188	13229E7190	Adapter Assembly, Quick Disconnect	1	EA
4730	01-487-3575		Tee Assembly, Quick Disconnect	1	AY
4730	01-499-8687	3629	Reducer, Quick Disconnect	2	EA
4730	01-499-8752	3630	Reducer, Quick Disconnect	2	EA
4820	01-440-5919	13229E7197	Valve, Check	1	AY
4820	01-440-7798	13229E7167	Valve, Gate	31	EA
4820	01-440-8302	13229E7177	Valve, Gate	2	EA
4820	01-440-8306	13229E7178	Valve, Gate	1	EA
4820	01-440-8765	13229E7169	Valve, Globe	3	EA
4930	01-120-7426	13225E9140	Stand Assembly, Distribution Nozzle	4	EA
6545	01-499-5676	02-1038	Case, Medical Instrument and Supply	1	EA
6630	01-044-0334	U25377	Comparator, Color	1	EA
7240	00-089-3827	MIL-C-43613	Can, Water, Military	1	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	**NIIN**	**LIN**	**Description**	**QTY**	**U/M**
5430	01-406-0507	T12938	Tank Assembly, Fabric Collaspible	1	EA
8115	01-241-7524	C13825	Container, Cargo	1	EA

Wastewater Management Set, Hospital, MRI 164 Bed

NSN					
FSC	NIIN	LIN	Description	QTY	U/M
3990	01-505-5922	W-2-404-836-SP-SJF	Cage, Wire, Folding	8	EA
4320	01-440-7388	13229E7222	Pump Assembly, Diaphram	4	EA
4720	01-140-6288	13225E9136-4	Hose Assembly, Nonmetallic	2	EA
4720	01-434-9594	13229E7223-2	Hose Assembly, Rubber	32	EA
4720	01-434-9605	13229E7223-3	Hose Assembly, Rubber	48	EA
4720	01-434-9627	13229E7226	Hose Assembly, Rubber	18	EA
4720	01-434-9638	13230E5746-4	Hose Assembly, Rubber	4	EA
4720	01-434-9646	13229E7223-1	Hose Assembly, Rubber	21	EA
4720	01-434-9649	13229E7223-4	Hose Assembly, Rubber	15	EA
4720	01-440-4925	13229E7176	Channel, Hose Protector	5	AY
4730	00-496-5952	WW-C-633-M	Wye, Quick Disconnect	32	EA
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4730	01-186-0821	AA59326XI-1-10	Reducer, Quick Disconnect	1	EA
4820	01-440-5916	13225E7225	Valve, Ball	4	EA
4930	01-120-7426	13225E9140	Stand Assembly, Distribution Nozzle	2	EA
6545	01-434-9587	13229E7229	Funnel Assembly	2	EA
6645	01-434-9630	13229E7224	Adapter, Sink	7	EA

Associated Support Items of Equipment (ASIOE)

NSN					
FSC	NIIN	LIN	Description	QTY	U/M
5430	01-406-0507	T12938	Tank Assembly, Fabric Collaspible	1	EA
8115	01-241-7524	C13825	Container, Cargo	1	EA

Water Distribution and Wastewater Management, Maintenance Set, MRI 164

NSN					
FSC	**NIIN**	**P/N**	**Description**	**QTY**	**U/M**
4010	00-228-9948	RR-C-271	Chain, Weldless	1	BX
4030	00-780-9350	MS87006-13	Hook, Chain	1	HD
4720	00-200-0361	ZZ-H-601	Hose Nonmetalic	100	FT
4720	00-876-8903	J-409	Clamp, Hose	2	EA
4720	01-392-2299	ZZ-H-601	Hose Nonmetalic	50	FT
4730	00-088-4298	AWR14	Seal	1	EA
4730	00-360-0592	MS27021-9	Coupling, Half, Quick Disconnect	3	EA
4730	00-360-0715	A-A-59326/11	Plug, Quick Disconnect	3	EA
4730	00-496-5953	AM-11	Coupling, Half, Quick Disconnect	3	EA
4730	00-823-5316	A-A-59326-11	Plug, Quick Disconnect	3	EA
4730	00-869-5246	MS27028-9	Cap, Quick Disconnect	3	EA
4730	00-909-8627	A-A-52506	Clamp, Hose	10	EA
4730	00-929-0791	MS27028-5	Cap, Quick Disconnect	3	EA
4730	00-948-1722	A-A-59326-6	Coupling, Half, Quick Disconnect	3	EA
4730	01-007-9254	J 405	Clamp, Hose	10	EA
4730	01-164-9254	MS27021-5	Coupling, Half, Quick Disconnect	3	EA
4730	01-222-0943	WW-C-633	Coupling, Half, Quick Disconnect	3	EA
4730	01-223-4931	MS27025-5	Coupling, Half, Quick Disconnect	3	EA
4930	00-253-2478	MIL-G-3859	Lubricating Gun, Hand	1	EA
5110	00-234-6534	A-A-2311	File, Hand	1	EA
5110	00-241-9151	A-A-2312	File, Hand	1	EA
5110	00-263-0349	NN-H-00106	Handle, File	2	EA
5110	00-277-4590	GGG-B-451	Blade, Hand Hacksaw	1	BD
5110	00-289-9657	A-A-453	Frame, Hand Hacksaw	1	EA
5120	00-010-7916	B107.15	Screwdriver, Flat Tip	1	EA
5120	00-061-8545	A-A-1305	Hammer, Hand	1	EA
5120	00-223-7397	B107.23M	Pliers, Slip Joint	1	EA
5120	00-277-1479	GGG-W-651	Wrench, Pipe	2	EA
5140	00-498-8772	CH77	Tool Box, Portable	3	EA
5325	00-926-5411	H01434M	Ring, Retaining	30	EA
5330	00-088-9167	MS27030-3	Gasket	15	EA
5330	00-360-0595	H064330M	Gasket	10	EA
5330	00-612-2414	H7388M	Gasket	4	EA
5330	00-741-7728	MIL-P-11719	Packing, Preformed	10	EA
5330	00-899-4509	H6476M	Gasket	2	EA
5330	01-141-1864	13220E1069-1	Gasket	2	EA
6810	01-358-4336	13229E0923	Sodium, Hypochlorite Technical	6	BG
7510	00-074-5124	A-A-1586	Tape, Pressure Sensitive, Adh	2	RO
8030	00-889-3534	A-A-58092	Tape, Antisiezing	15	EA
9150	01-226-4315	Pacesetter EP-65	Grease, General Purpose	3	TU

Water Distribution Connection Set

NSN					
FSC	NIIN	P/N	Description	QTY	U/M
3990	01-505-5922	W-2-404-836-SP-SJF	Cage, Wire, Folding	3	EA
4720	01-438-8335	13225E9136-18	Hose Assembly, Nonmetallic	10	EA
4730	01-064-0560	AA59326XI-1-9	Reducer, Quick Disconnect	1	EA
4820	01-440-8306	13229E7178	Valve, Gate	1	EA

APPENDIX D
ORGANIZATIONAL MAINTENANCE
REPAIR PARTS AND COMPONENTS
WATER DISTRIBUTION SET

SECTION 1. INTRODUCTION

D-1. Scope. This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for the performance of organizational maintenance of the Water Distribution Set, Hospital, DEPMEDS.

D-2. General. In addition to Section 1, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. Section 2 – Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of parts, with the components of each part listed in ascending figure and item number sequence. Bulk materials are listed by item name in FIG BULK at the end of the section.

b. Section 3 – Special Tools List. Not applicable.

c. Section 4 – Cross reference Indexes. Not applicable.

D-3. Explanation of Columns (Section 2).

a. FIG NO. (Column 1a). This column lists the number of the figure where the item is identified/located.

b. ITEM NO. (Column 1b). Indicates the number used to identify items called out in the illustration.

c. SMR Code.(Column 2).

(1) *Source Code* (2 positions). Codes are entered in the first and second positions of the SMR indicating the source for replacement purposes, i.e., procured and stocked, manufactured or assembled.

Code	Explanation
PA	Item procured and stocked for anticipated or known usage. Items are normally considered for replenishment.
PB	Item procured and stocked for insurance purposes because essentiality dictates that a quantity be available in the supply system.
PC	Item procured and stocked but is deteriorative in nature.
PD	Support item, excluding support equipment, procured for initial issue and stocked only for subsequent or additional initial issues. Not subject to automatic replenishment.
PE	End item and/or support equipment procured and stocked for initial issue for specific maintenance activities
PF	Support equipment which will not be stocked but which will be centrally procured on demand.
PG	Item procured and stocked to provide for sustained support for the life of the equipment. It is applied to an item that, because of probable discontinuance or shutdown of production facilities would prove uneconomical to reproduce at a later time.
PH	Item procured and stocked and has been identified to contain hazardous materiel, item requires recordation in the Hazardous Materiel Information System (HMIS) and a Materiel Safety Data Sheet (MSDS).
PR	End item and/or support item, terminal or obsolete and replaced. No longer authorized for procurement. On hand assets may be issued until exhausted. Then use replacement item.
PZ	Item terminal or obsolete with no replacement, discontinue use.
KD	An item contained in a depot overhaul/repair kit and not purchased separately. Depot kit defined as a kit that provided items required at the time of depot overhaul or repair.
KF	An item contained in a maintenance kit and not purchased separately. Maintenance kit defined as a kit that provides an item that can be replaced at organizational or intermediate levels of maintenance.
KB	Item included in both a depot overhaul/repair kit and a maintenance kit.
MO	Item to be manufactured or fabricated at organizational level.
MF	Item to be manufactured or fabricated at DS level.
MH	Item to be manufactured or fabricated at GS level.
MD	Item to be manufactured or fabricated at depot level.
AO	Item to be assembled at organizational level.
AF	Item to be assembled at DS level.
AH	Item to be assembled at GS level.
AD	Item to be assembled at depot level.
XA	Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly.
XB	Support item with low mortality rate, not procured or stocked.
XC	Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD	Support item with low mortality rate, not stocked. Local purchase or requisition through normal supply channels.

(2) *Maintenance Code* (2 positions).

(a) General. Maintenance codes are assigned to indicate the levels of maintenance authorized to USE, REMOVE, REPLACE, or REPAIR support items. The maintenance codes are entered in the third and fourth positions are as follows:

(b) USE (third position). This position will indicate the lowest maintenance level authorized to remove, replace and use the support item.

Code	Explanation
O	Support item is removed, replaced, used at the organizational level of maintenance.
F	Support item is removed, replaced, used at the DS level.
Code	**Explanation**
H	Support item is removed, replaced, used at the GS level.
K	Repairable item. Item is removed, replaced or used at contractor facility.
D	Item is removed, replaced or used at Depot level only.

(b) REPAIR (fourth position). This position will indicate whether the item is to be repaired and identifies the lowest maintenance level with the capabilities to perform complete repair. This code will only be used if the first position of the SMR code is "P". When a maintenance code is not used a date "-" sign will be entered.

Code	Explanation
O	Maintenance at the organizational level of maintenance.
F	Maintenance at the DS level.
H	Maintenance at the GS level.
K	Repairable item. Item is repaired at contractor facility.
D	Repair at Depot level only.

(3) *Recoverability Code* (1 position). Code entered in the fifth position indicates the desired disposition of the support item.

Code	Explanation
Z	Non-repairable item. When item becomes unserviceable, condemn and dispose of at authorized level.
O	Repairable item. When uneconomically repairable, condemn and dispose at organization level.
F	Repairable item. When uneconomically repairable, condemn and dispose at DS level.
H	Repairable item. When uneconomically repairable, condemn and dispose at GS level.
K	Repairable item. Condemnation and dispose at Contractor facility.
D	Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L	Repairable item. Condemnation and disposal not authorized below depot level.

d. NSN (Column 3). The National Stock Number which is used to identify the item.

e. PART NUMBER (Column 4). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity) that controls the design, specifications, standards, and inspection requirements to identify an item or range of items.

f. DESCRIPTION (Column 5). This column contains the following information:

(1) The Federal Item name and, when required, a minimum description to identify the item.

(2) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.

(3) Part numbers for bulk materials are references in this column in the line item entry for the item to be manufactured/fabricated.

(4) The usable on code. Not applicable.

g. QTY (Column 6). The QTY (quantity per figure column) indicates the quantity of the item used in the illustration figure. A “V” appearing in this column in lieu of a quantity indicates that the quantity is variable and quantity may vary from application to application.

h. UI (Column 7). The UI (Unit of Issue) indicates the unit of issue of the item used in the illustrated figure. A “AR” appearing in this column in lieu of a unit of issue indicates that the unit is as required and may vary from application to application.

i. SOS (Column 8). The SOS (Source of Supply) indicates the source from which the part may be ordered.

D-4. Explanation of Columns (Section 4). Not applicable.

D-5. Special Information. Not applicable.

D-6. How to Locate Repair Parts.

a. When NSN or Part Number is Not Known.

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

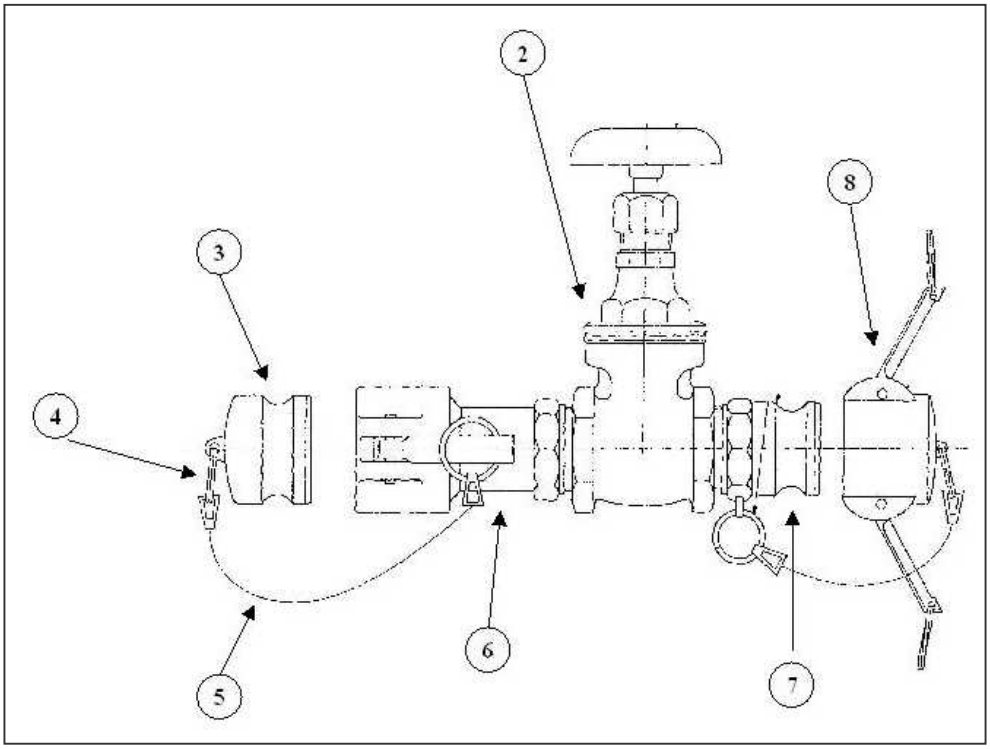
(2) Second. Find the figure covering the assembly group of subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and use the corresponding table to find the NSN or Part Number.

b. When NSN or Part Number is Known. Not applicable.

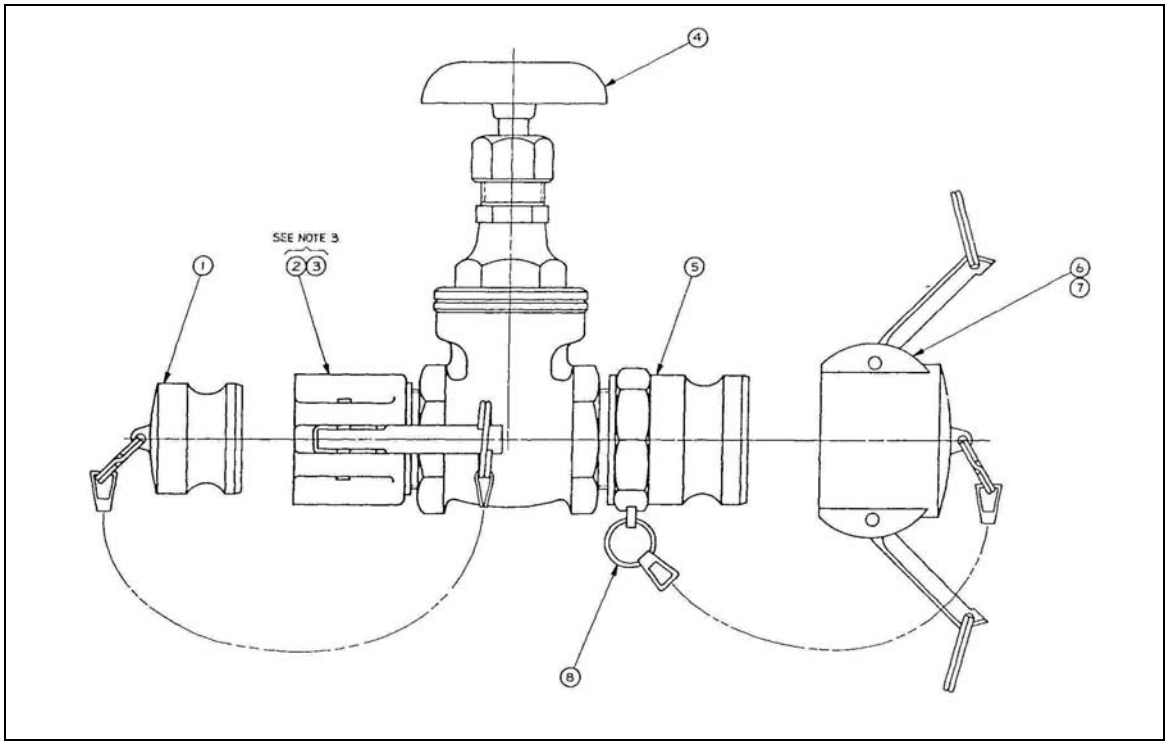
D-7. Abbreviations. Not applicable.

SECTION 2 – REPAIR PARTS LISTS
Valve, Gate, 2 inch female, 1½ inch male
Figure D-1



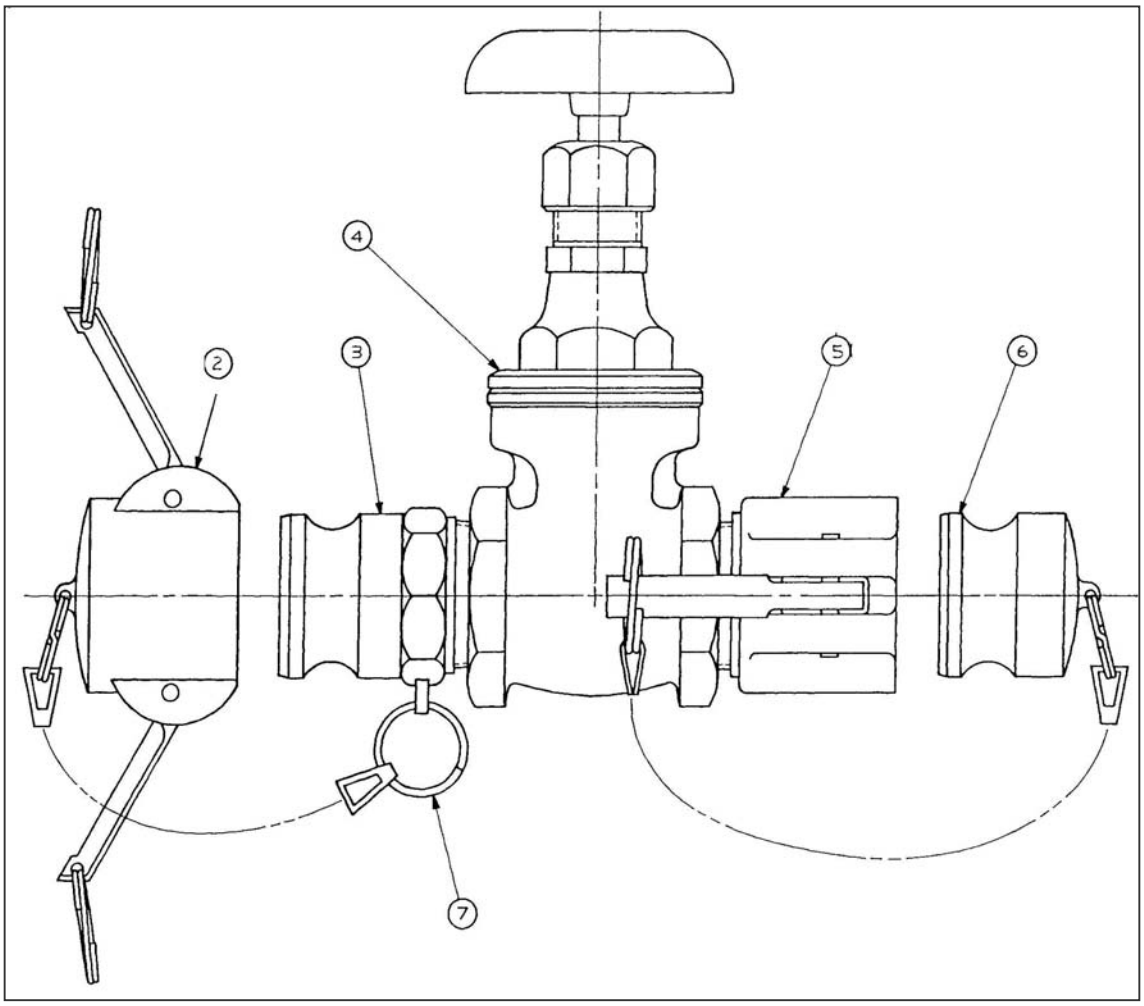
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
1	1	PDOOO	4820-01-440-8306	13229E7178	Valve, Gate 2"F x 1 1/2"M	1	EA	S9C
1	2	XA--Z	4820-01-358-2557	MSS-SP-80	Valve, Gate	1	EA	S9C
1	3	PDO-Z	4730-00-915-5127	MS27029-11	Plug, Quick Disconnect 2"	1	EA	S9C
1	4	PAO-Z	5325-00-926-5411	H01434M	Retaining Ring	6	EA	S9I
1	5	PAO-Z	4010-00-228-9948	RR-C-271	Chain, Weldless	V	BX	S9G
1	6	PDOOO	4730-01-192-1624	MS49002-9	Coupling Half, Quick Disconnect F 2"	1	EA	S9C
1	7	PDOOO	4730-00-360-0589	MS27002-9	Coupling Half, Quick Disconnect M 1 1/2"	1	EA	S9C
1	8	PDOOO	4730-00-869-5246	MS27028-9	Cap Quick Disconnect 1 1/2"	1	EA	S9C
1		PAO-Z	8030-00-889-3534	A-A-58092	Tape Antisiezing	V	EA	GSA

SECTION 2 – REPAIR PARTS LISTS
Valve, Gate, 1½ inch female, 2 inch male
Figure D-2



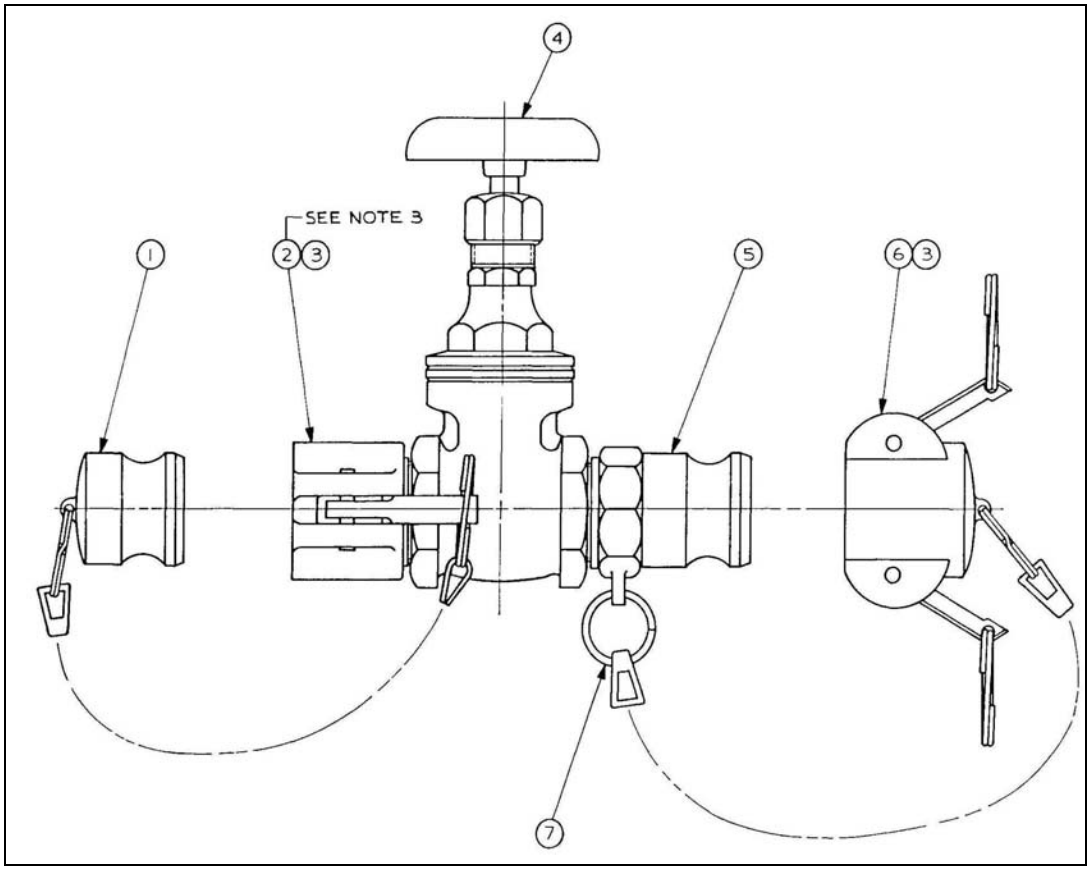
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
2		PDOOO	4820-01-440-8302	13229E7177	Valve, Gate 1 1/2"F x 2"M	1	EA	S9C
2	1	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect	1	EA	S9C
2	2	PDOOO	4730-00-980-9411	MS27024-2	Coupling Half Quick Disconnect 1 1/2"F NPT	1	EA	S9C
2	3	PAO-Z	5530-00-360-0595	MS27030-5	Gasket	1	EA	S9I
2	4	XA-Z	4820-01-358-2557	MSS-SP-80	Valve, Gate	1	EA	S9C
2	5	PDOOO	4730-00-432-7448	MS49001-9	Coupling Half Quick Disconnect 2"M w/1 1/2M" NPT	1	EA	S9C
2	6	PDOOO	4730-00-649-9100	MS27028-11	Cap, Quick Disconnect 2"	1	EA	S9C
2	7	PAO-Z	5330-00-612-2414	MS27030-6	Gasket	1	EA	S9I
2	8	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	5	EA	S9G
2		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Valve, Globe, 1½ inch female, 1 1/2 inch male
Figure D-3



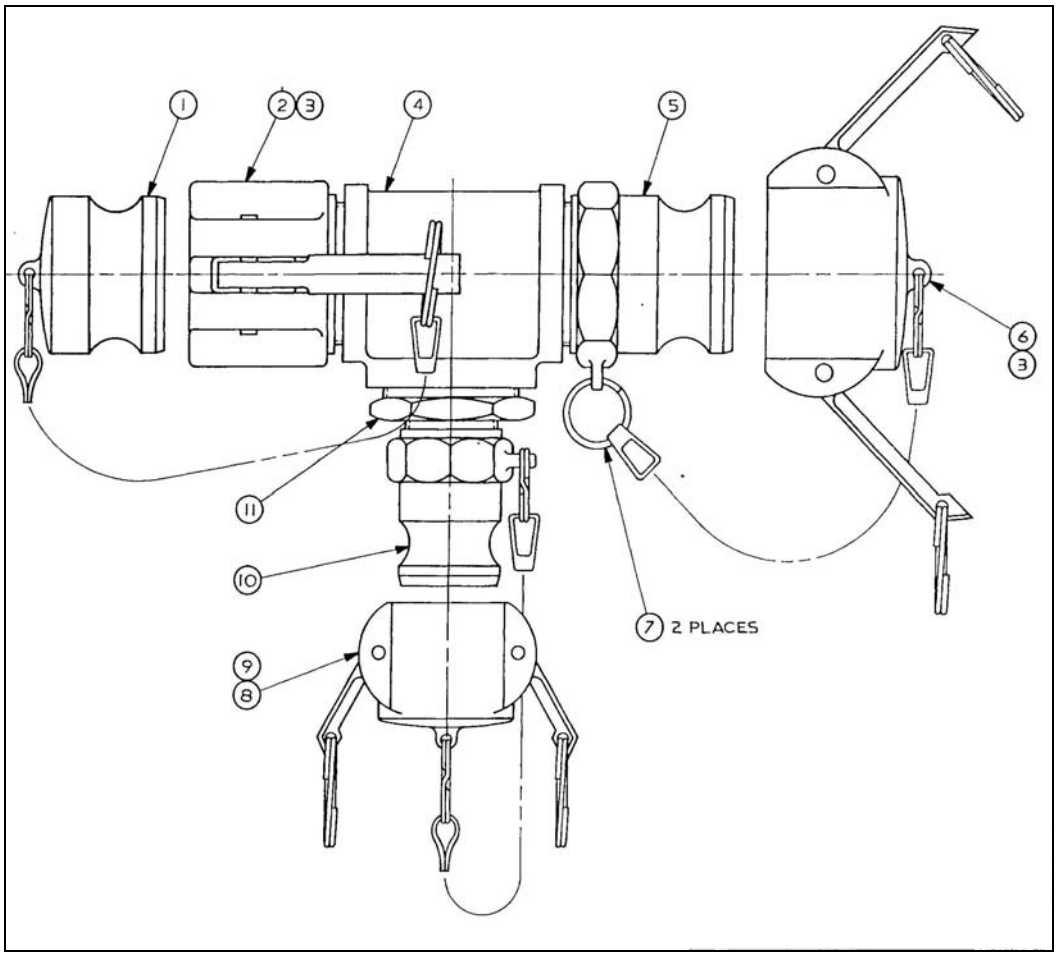
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
3	1	PDOOO	4820-01-440-8765	13229E7169	Valve, Globe Assembly 1 1/2"F x 1 1/2"M	1	EA	S9C
3	2	PDOOO	4730-00-869-5246	MS27028-9	Cap Quick Disconnect 1 1/2"	1	EA	S9C
3	3	PDOOO	4730-00-360-0592	MS27021-9	Coupling Half Quick Disconnect 1 1/2" M	1	EA	S9C
3	4	XA-Z	4820-00-262-6877	MSS-SP-80	Valve, Globe	1	EA	S9C
3	5	PDOOO	4730-00-980-9411	MS27024-9	Coupling Half Quick Disconnect 1 1/2" F	1	EA	S9C
3	6	PDO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	1	EA	S9C
3	7	PAO-Z	5325-00-926-5411	H01434M	Ring Retaining	6	EA	S9I
3		PAO-Z	8030-00-889-3534	A-A-58092	Tape Antiseizing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Valve, Gate, 1 Inch Female x 1 Inch Male
Figure D-4



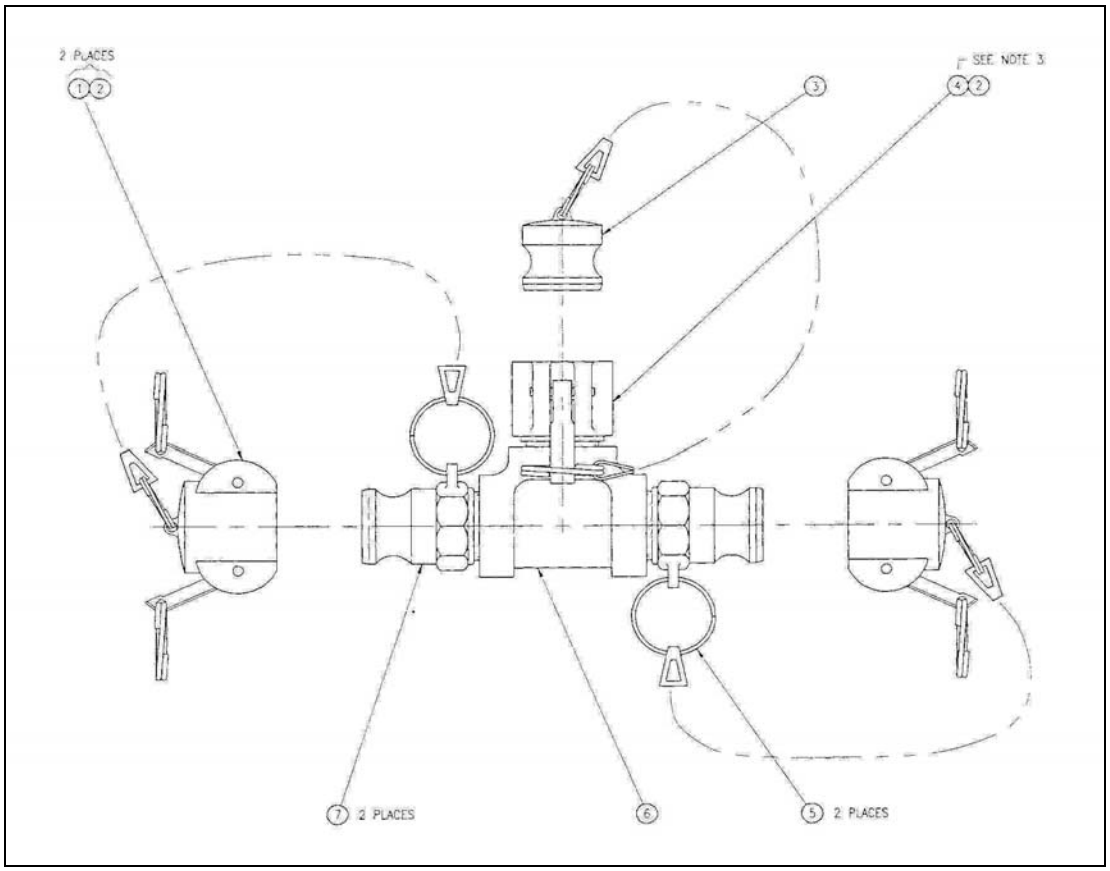
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
4		PDOOO	4820-01-440-7798	13229E7167	Valve, Gate Assembly 1"F x 1"M	1	EA	S9C
4	1	PDO-Z	4730-00-360-0715	MS27029-5	Plug, Quick Disconnect 1"	1	EA	S9C
4	2	PDOOO	4730-00-360-0710	MS27024-5	Coupling Half Quick Disconnect 1"F w/M NPT	1	EA	S9C
4	3	PAO-Z	5330-00-088-9167	MS27030-4	Gasket	2	EA	S9I
4	4	XA-Z	4820-00-554-8715	WWV54	Valve, Gate	1	EA	S9C
4	5	PDOOO	4730-00-084-7435	MS27022-5	Coupling Half Quick Disconnect 1"M w/M NPT	1	EA	S9C
4	6	PDOOO	4730-00-360-0791	MS27028-5	Cap, Quick Disconnect 1"	1	EA	S9C
4	7	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	6	EA	S9I
4		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Tee Assembly, Quick Disconnect
1½ Inch Female x 1½ Inch Male x 1 Inch Male
Figure D-5



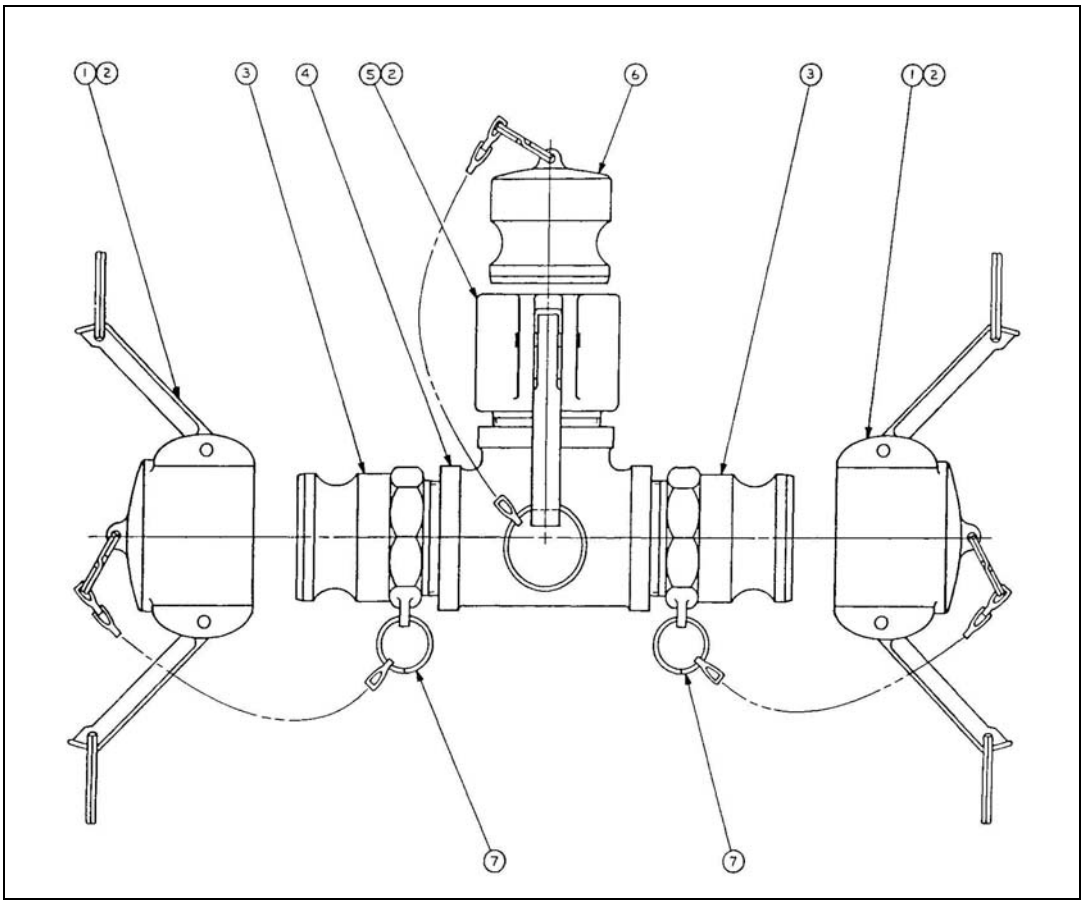
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(7) SOS
5		PDOOO	4730-01-440-4609	13229E7172	Tee Assembly Quick Disconnect 1 1/2"F x 1 1/2"M x 1" M	1	AY	S9C
5	1	PDO-Z	4730-00-823-5316	MS217029-9	Plug, Quick Disconnect, 1 1/2"	1	EA	S9C
5	2	PDOOO	4730-00-980-9411	MS27024-9	Coupling Half Quick Disconnect 1 1/2"F NPT	1	EA	S9C
5	3	PAO-Z	5330-00-360-0595	MS27030-5	Gasket	2	EA	S9I
5	4	XA-Z	4730-01-439-9316	13229E7191-25	Tee, Pipe	1	EA	S9C
5	5	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M NPT	1	EA	S9C
5	6	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect, 1 1/2"	1	EA	S9C
5	7	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	9	EA	S9I
5	8	PDOOO	4730-00-929-0791	MS27028-5	Cap, Quick Disconnect, 1"	1	EA	S9C
5	9	PAO-Z	5330-00-088-9167	MS27030-3	Gasket	1	EA	S9I
5	10	PDOOO	4730-00-084-7435	MS27022-5	Coupling Half Quick Disconnect 1 "M NPT	1	EA	S9C
5	11	PAO-Z	4730-01-440-0076	13229E7191-23	Bushing, Pipe 1 1/2" x 1"	1	EA	S9C
5		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antiseizing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Tee Assembly, Quick Disconnect
1 Inch Female x 1 Inch Male x 1 Inch Male
Figure D-6



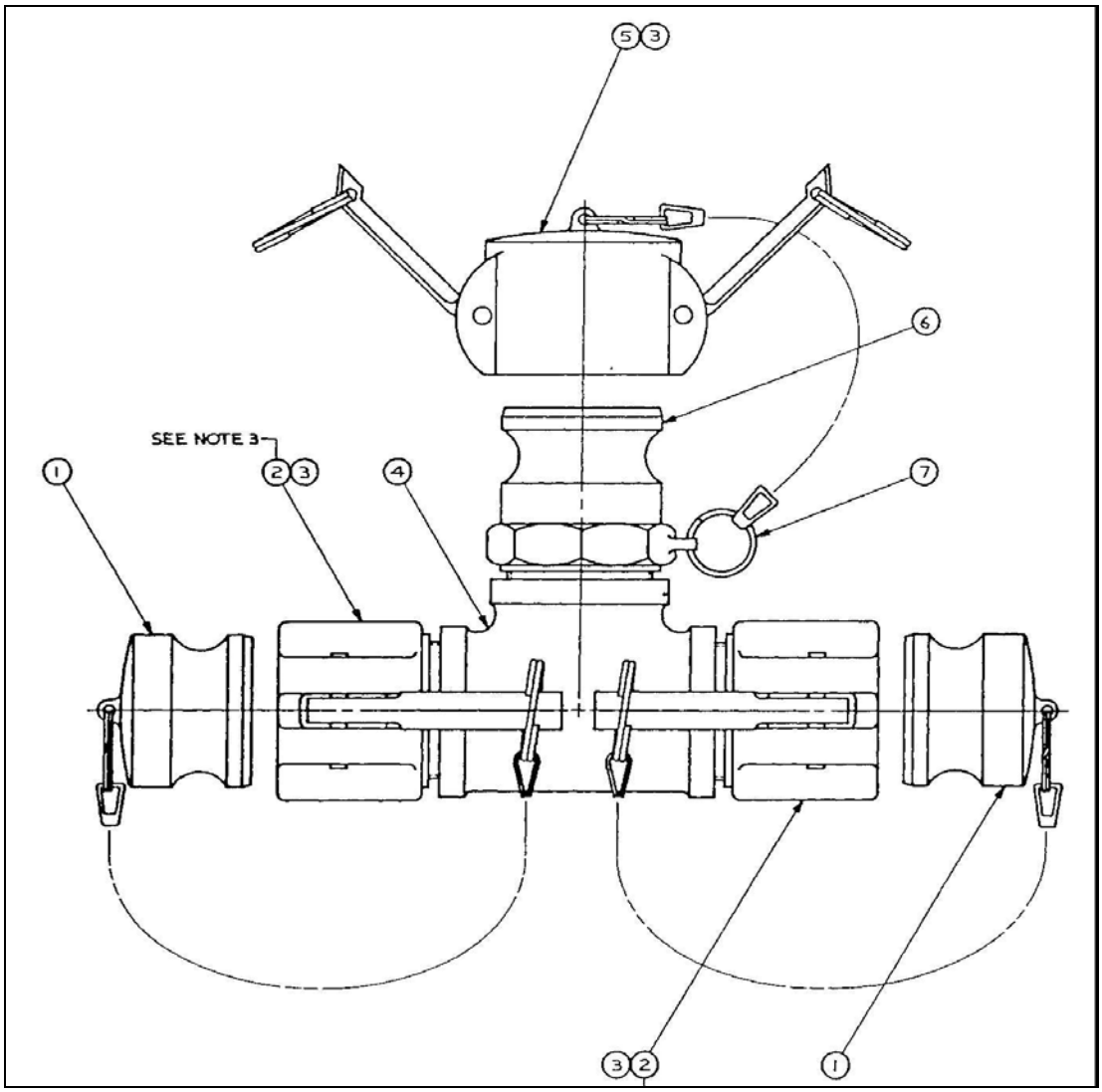
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
6		PDOOO	4730-01-440-4091	13229E0361	Tee Assembly Quick Disconnect 1"F x 1"M x 1"M	1	EA	S9C
6	1	PDOOO	4730-00-360-0791	MS27028-5	Cap, Quick Disconnect 1"	2	EA	S9C
6	2	PAO-Z	5330-00-088-9167	MS27030-4	Gasket	2	EA	S9I
6	3	PDO-Z	4730-00-360-0715	MS27029-5	Plug, Quick Disconnect 1"	1	EA	S9C
6	4	PDOOO	4730-00-360-0710	MS27026-5	Coupling Half Quick Disconnect 1"F w/M NPT	1	EA	S9C
6	5	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	11	EA	S9I
6	6			M52618/1 B06XC	Tee, Pipe Straight 1"	1	EA	S9C
6	7	PDOOO	4730-00-084-7435	MS27022-5	Coupling Half Quick Disconnect 1"F w/M NPT	2	EA	S9C
6		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Tee Assembly, Quick Disconnect
1 1/2 Inch Male x 1 1/2 Inch Male x 1 1/2 Inch Female
Figure D-7



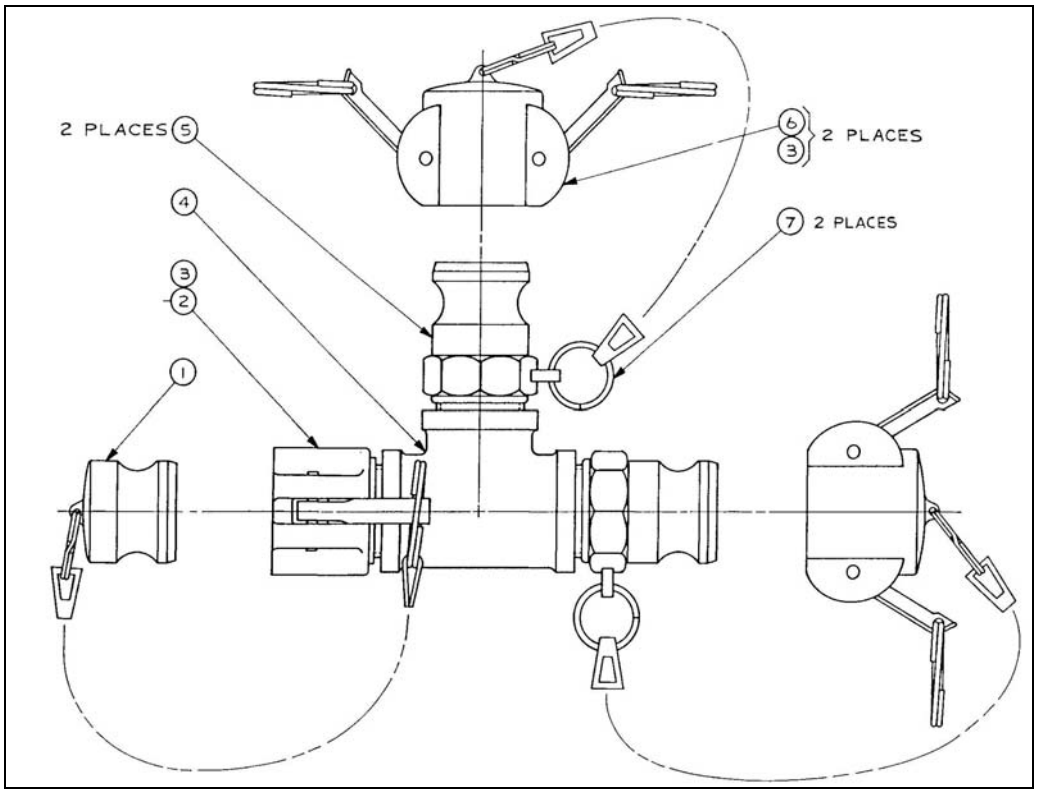
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
7		PDOOO	4730-01-440-4633	13229E7182	Tee Assembly Quick Disconnect 1 1/2"M x 1 1/2"M x 1 1/2"F	1	EA	S9C
7	1	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	2	EA	S9C
7	2	PAO-Z	5330-00-360-0595	MS27030-5	Gasket	3	EA	S9I
7	3	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M w/M NPT	2	EA	S9C
7	4	XA--Z	4730-01-439-9316	13229E7192	Tee, Pipe	1	EA	S9C
7	5	PDOOO	4730-00-980-9411	MS27024-9	Coupling Half Quick Disconnect 1 1/2"F w/M NPT	1	EA	S9C
7	6	PDO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	1	EA	S9C
7	7	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	11	EA	S9I
7		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antiseizing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Tee Assembly, Quick Disconnect
1 1/2 Inch Female x 1 1/2 Inch Female x 1 1/2 Inch Male
Figure D-8



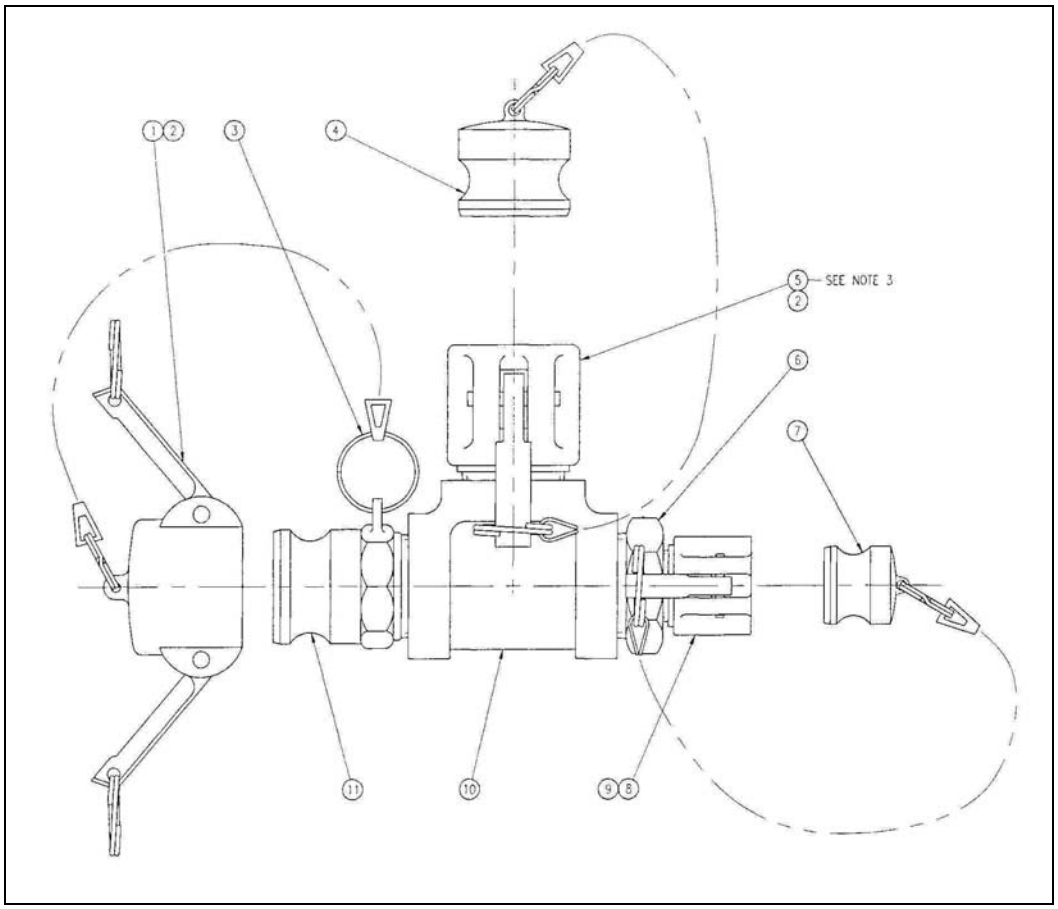
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
8		PDOOO	4730-01-440-4615	13229E7181	Tee Assembly Quick Disconnect 1 1/2"F x 1 1/2"F x 1 1/2"M	1	EA	S9C
8	1	PDO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	2	EA	S9C
8	2	PDOOO	4730-00-203-1010	MS27026-9	Coupling Half Quick Disconnect 1 1/2"F w/M NPT	2	EA	S9C
8	3	PAO-Z	5330-00-360-0595	MS27030-5	Gasket	3	EA	S9I
8	4	XA--Z	4730-01-439-9316	13229E7192	Tee, Pipe	1	EA	S9C
8	5	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	1	EA	S9C
8	6	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M w/M NPT	1	EA	S9C
8	7	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	8	EA	S9I
8		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antiseizing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Tee Assembly, Quick Disconnect
1 1/2 Inch Female x 1 1/2 Inch Male x 1 Inch Male
Figure D-9



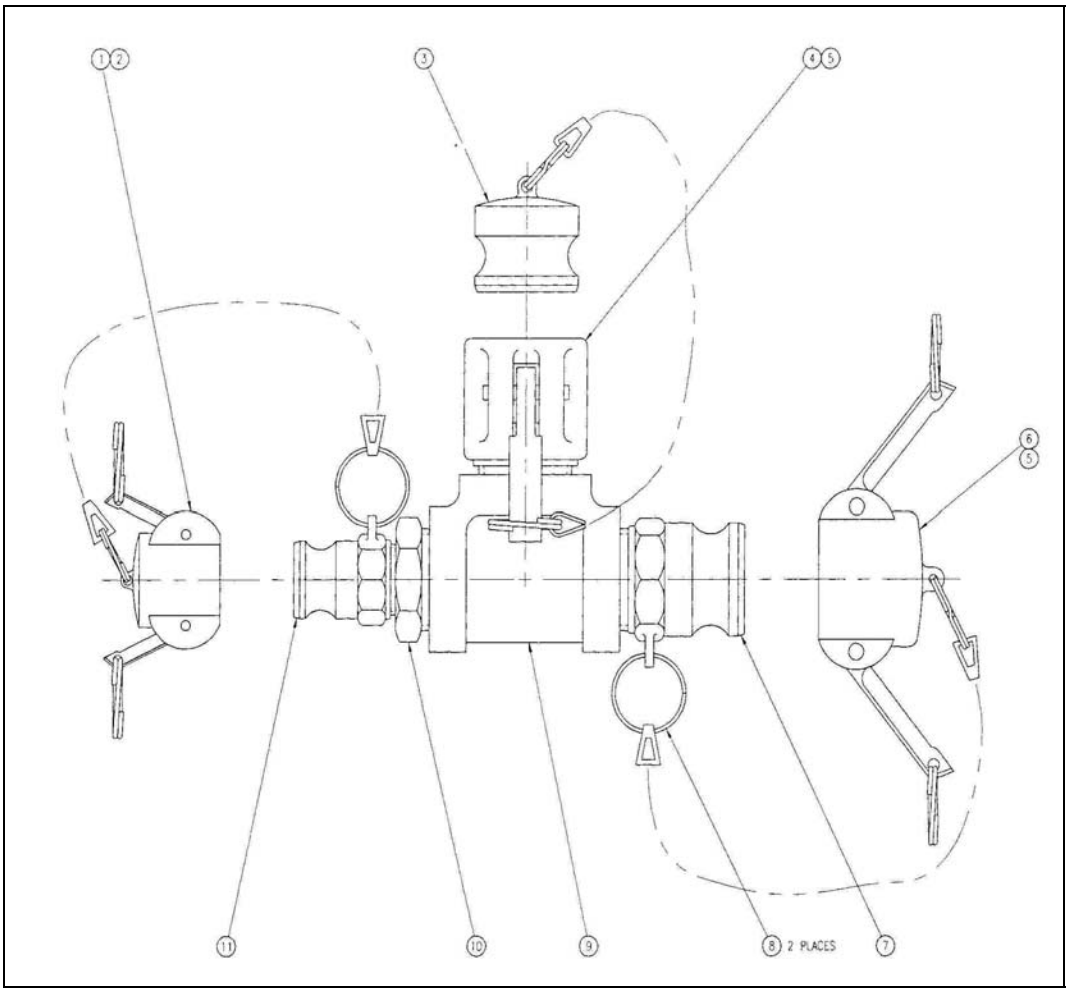
(1)								
(a) FIG NO.	(b) ITEM NO.	(3) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
9		PDOOO	4730-01-440-4613	13229E7174	Tee Assembly Quick Disconnect 1 1/2"F x 1 1/2"M x 1"M	1	AY	S9C
9	1	PDO-Z	4730-00-360-0715	MS27029-5	Plug, Quick Disconnect	1	EA	S9C
9	2	PDOOO	4730-00-042-5265	MS27024-5	Coupling Half Quick Disconnect 1"F	1	EA	S9C
9	3	PAO-Z	5330-00-088-9167	MS27030-3	Gasket	2	EA	S9I
9	4	XA--Z	4730-01-439-9291	13229E7191-19	Tee, Pipe	1	EA	S9C
9	5	PDOOO	4730-00-084-7435	MS27022-5	Coupling Half Quick Disconnect 1"M	2	EA	S9C
9	6	PDOOO	4730-00-929-0791	MS27028-5	Cap, Quick Disconnect 1"	2	EA	S9C
9	7	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	8	EA	S9I
9		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antiseizing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Tee Assembly, Quick Disconnect
1 1/2 Inch Male x 1 Inch Female x 1 1/2 Inch Female
Figure D-10



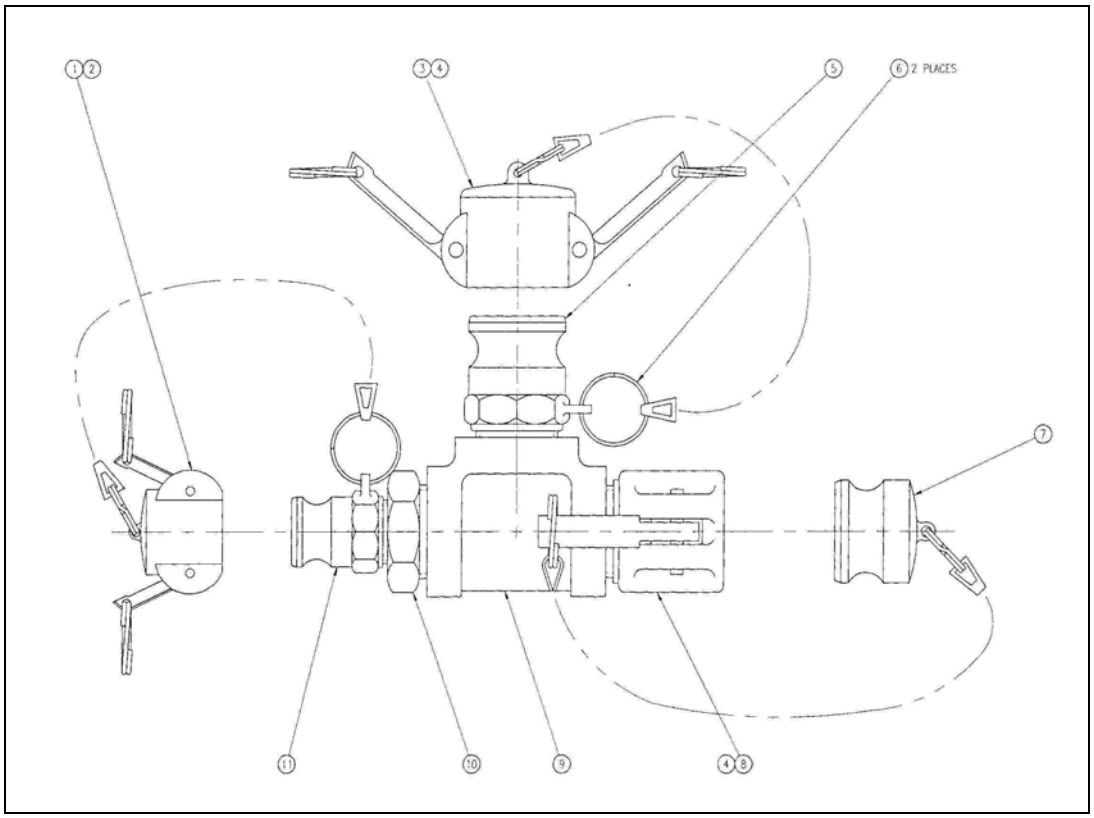
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
10		PDOOO	4730-01-440-4931	13230E5716	Tee Assembly Quick Disconnect 1 1/2"M x 1"M x 1 1/2"F	1	EA	S9C
10	1	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	1	EA	S9C
10	2	PAO-Z	5330-00-360-0595	MS27030-5	Gasket	2	EA	S9I
10	3	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	10	EA	S9I
10	4	PDO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	1	EA	S9C
10	5	PDOOO	4730-00-203-1010	MS27026-9	Coupling Half Quick Disconnect 1 1/2"F w/M NPT	1	EA	S9C
10	6	XA--Z		MS4001-9	Reducer, Pipe	1	EA	
10	7	PDO-Z	4730-00-360-0715	MS29029-5	Plug, Quick Disconnect 1 "	1	EA	S9C
10	8	PDOOO	4730-00-360-0710	MS27026-5	Coupling Half Quick Disconnect 1"F w/M NPT	1	EA	S9C
10	9	PAO-Z	5330-00-088-9167	MS27030-4	Gasket	1	EA	S9I
10	10	XA--Z	4730-01-439-9316	13229E7192	Tee, Pipe	1	EA	S9C
10	11	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M w/M NPT	1	EA	S9C
10		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Tee Assembly, Quick Disconnect
1 Inch Male x 1 1/2 Inch Male x 1 1/2 Inch Female
Figure D-11



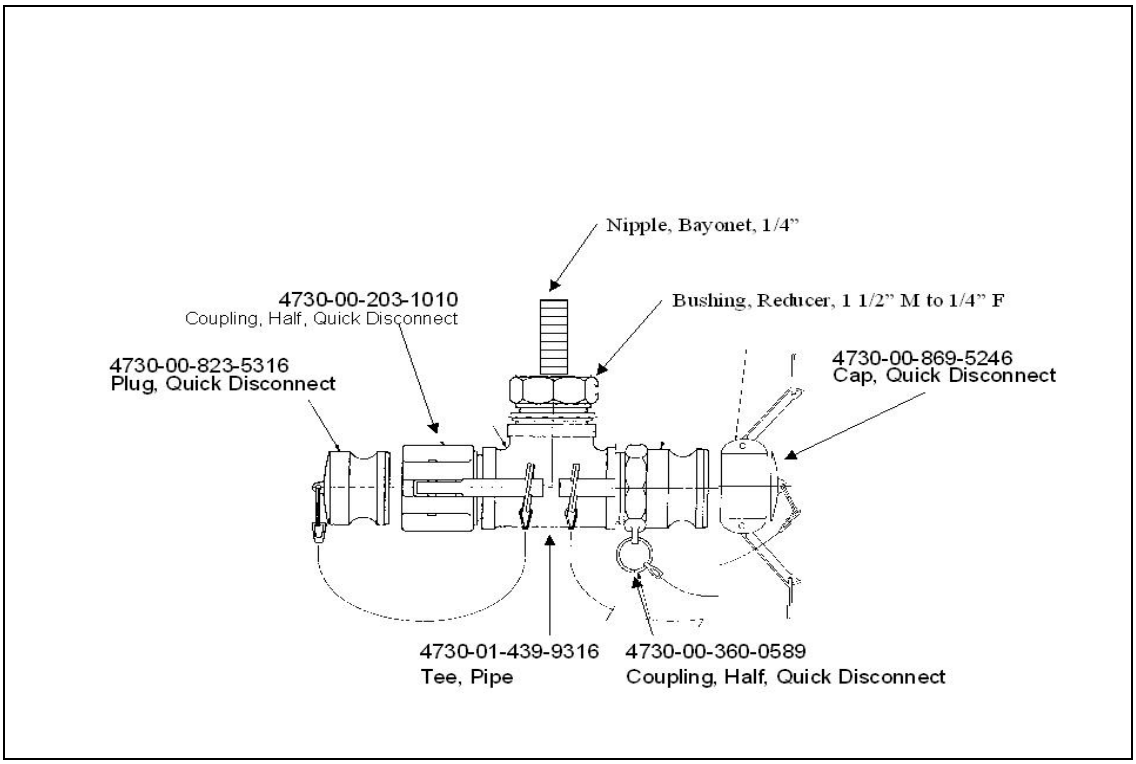
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
11		PDOOO	4730-01-440-4933	13230E5717	Tee Assembly Quick Disconnect 1"M x 1 1/2"M x 1 1/2"F	1	EA	S9C
11	1	PDOOO	4730-00-360-0791	MS27028-5	Cap, Quick Disconnect 1 "	1	EA	S9C
11	2	PAO-Z	5330-00-088-9167	MS27030-4	Gasket	2	EA	S9I
11	3	PAO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	1	EA	S9C
11	4	PDOOO	4730-00-203-1010	MS27026-9	Coupling Half Quick Disconnect 1 1/2"F w/M NPT	1	EA	S9C
11	5	PAO-Z	5330-00-360-0595	MS27030-5	Gasket	2	EA	S9I
11	6	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	1	EA	S9C
11	7	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M w/M NPT	1	EA	S9C
11	8	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	11	EA	S9I
11	9	XA--Z	4730-01-439-9316	13229E7192	Tee, Pipe	1	EA	S9C
11	10	XA-Z		MS4001-9	Reducer, Pipe	1	EA	
11	11	PDOOO	4730-00-084-7435	MS27022-5	Coupling Half Quick Disconnect 1"M w/M NPT	1	EA	S9C
11		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Tee Assembly, Quick Disconnect
1 Inch Male x 1 1/2 Inch Female x 1 1/2 Inch Male
Figure D-12



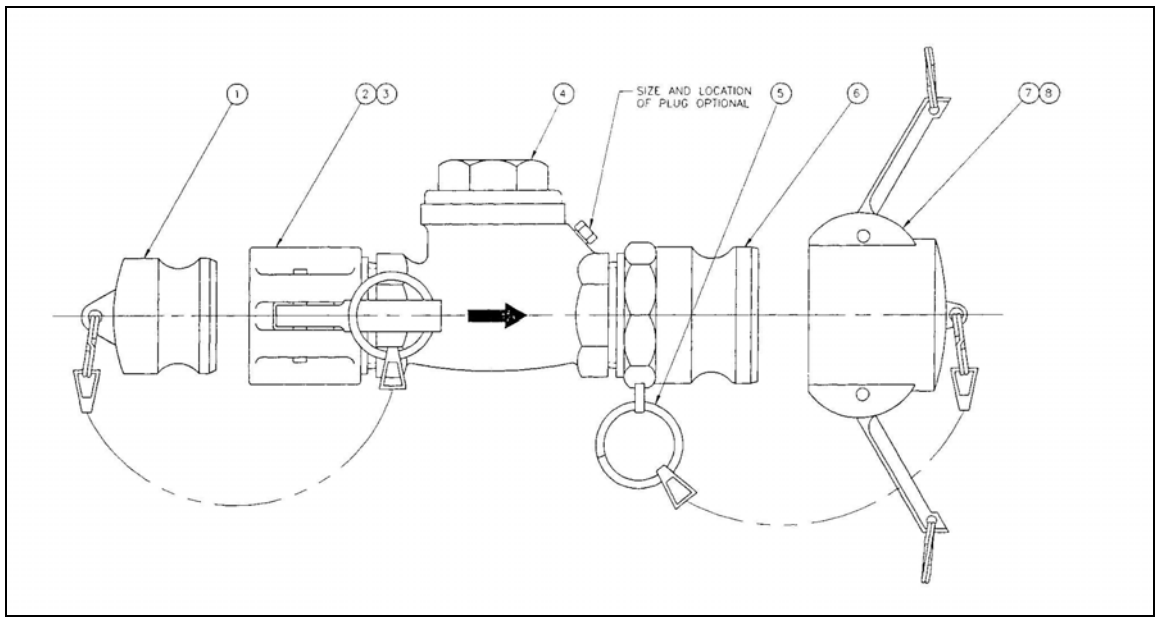
(1)								
(a) FIG NO>	(b) ITEM NO>	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
12		PDOOO	4730-01-440-4938	13230E5717	Tee Assembly Quick Disconnect 1 "M x 1 1/2"F x 1 1/2"M	1	EA	S9C
12	1	PDOOO	4730-00-360-0791	MS27028-5	Cap, Quick Disconnect 1"	1	EA	S9C
12	2	PAO-Z	5330-00-088-9167	MS27030-4	Gasket	1	EA	S9I
12	3	PAO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	1	EA	S9C
12	4	PDOOO	4730-00-203-1010	MS27026-9	Coupling Half Quick Disconnect 1 1/2"F w/M NPT	1	EA	S9C
12	5	PAO-Z	5330-00-360-0595	MS27030-5	Gasket	2	EA	S9I
12	6	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	1	EA	S9C
12	7	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M w/M NPT	1	EA	S9C
12	8	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	11	EA	S9I
12	9	XA--Z	4730-01-439-9316	13229E7192	Tee, Pipe	1	EA	S9C
12	10	XA--Z		MS4001-9	Reducer, Pipe	1	EA	
12	11	PDOOO	4730-00-084-7435	MS27022-5	Coupling Half Quick Disconnect 1"M w/M NPT	1	EA	S9C
12		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Tee Assembly, Quick Disconnect
1 1/2 Inch Female x 1 1/2 Inch Male x ¼ Inch Male
Figure D-13



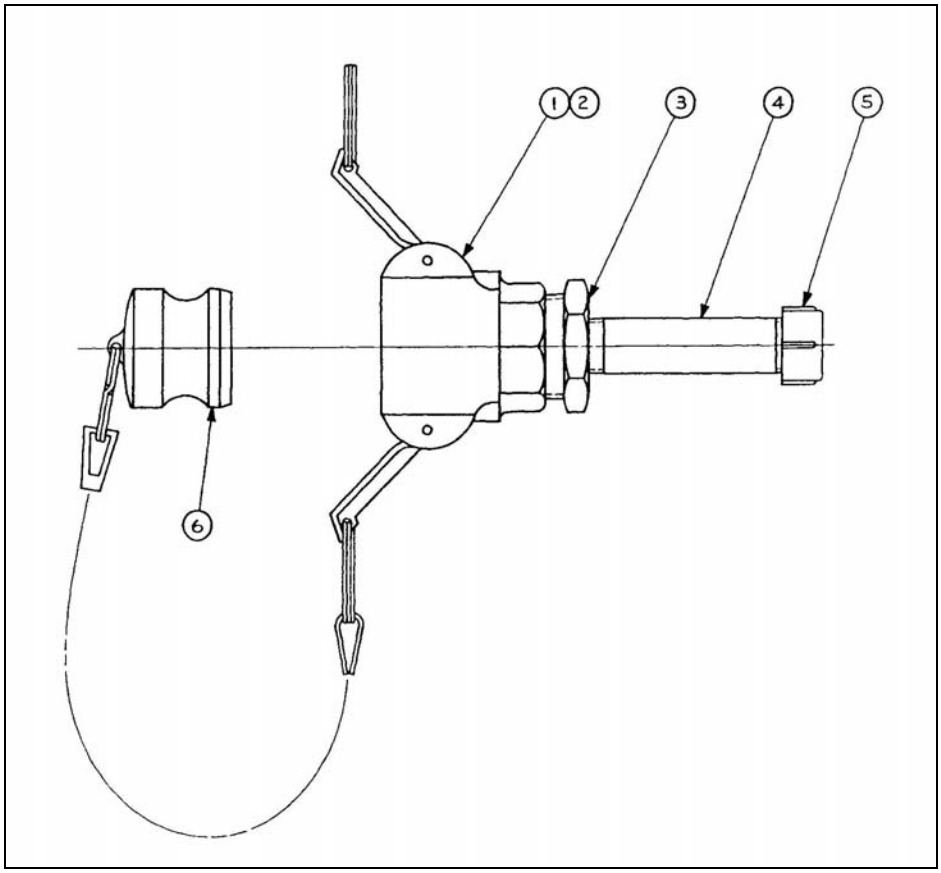
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
13		PDOOO	4730-01-487-3575		Tee Assembly Quick Disconnect 1 1/2"F x 1 1/2"M 1/4"M	1	EA	S9M
13		PAO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	1	EA	S9C
13		PDOOO	4730-00-203-1010	MS27026-9	Coupling Half Quick Disconnect 1 1/2"F w/M NPT	1	EA	S9C
13		XA-Z	4730-01-439-9316	13229E7192	Tee, Pipe	1	EA	S9C
13		PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect w/M NPT	1	EA	S9C
13		PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	1	EA	S0C
13		XA-Z			Bushing, Reducer 1 1/2"M to 1/4" F	1	EA	
13		PAO-Z	5330-00-360-0595	MS27030-5	Gasket	2	EA	S9I
13		PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	7	EA	S9I
13		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Valve, Check
Figure D-14



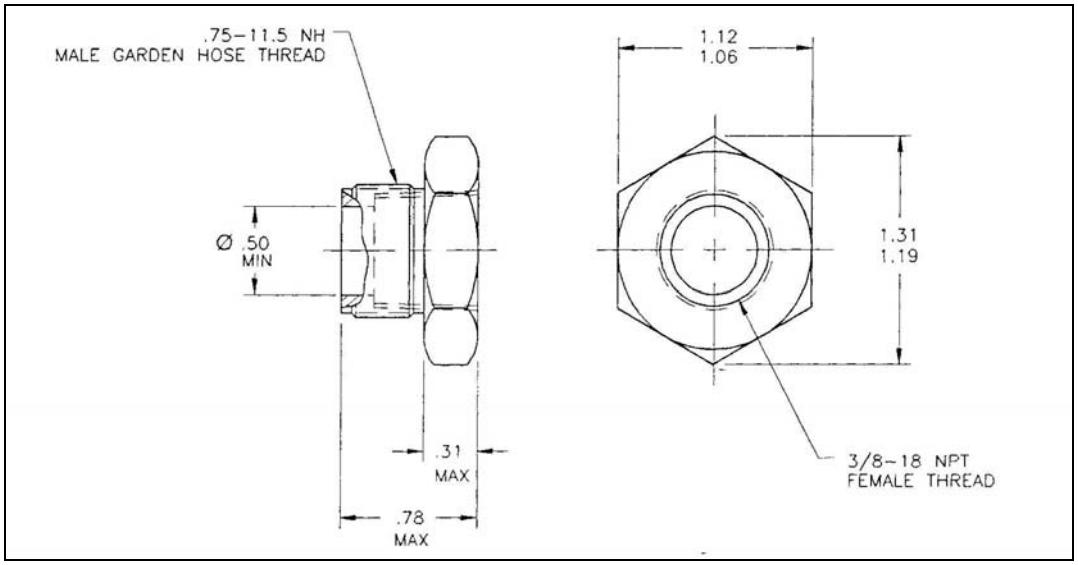
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
14	1	PDOOO	4820-01-440-5919	13229E7197	Valve, Check	1	AY	S9C
14	2	PAO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	1	EA	S9C
14	3	PDOOO	4730-00-980-9411	MS27024-9	Coupling, Quick Disconnect 1 1/2" F	1	EA	S9C
14	4	XA--Z	4730-01-440-0038	13229E7191	Tee, Pipe	1	EA	S9C
14	5	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	6	EA	S9I
14	6	PDOOO	4730-00-432-7448	MS49001-9	Coupling, Quick Disconnect 2"M	1	EA	S9C
14	7	PDOOO	4730-00-649-9100	MS27028-11	Cap, Quick Disconnect 2"	1		S9C
14		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Plug Quick Disconnect
Figure D-15



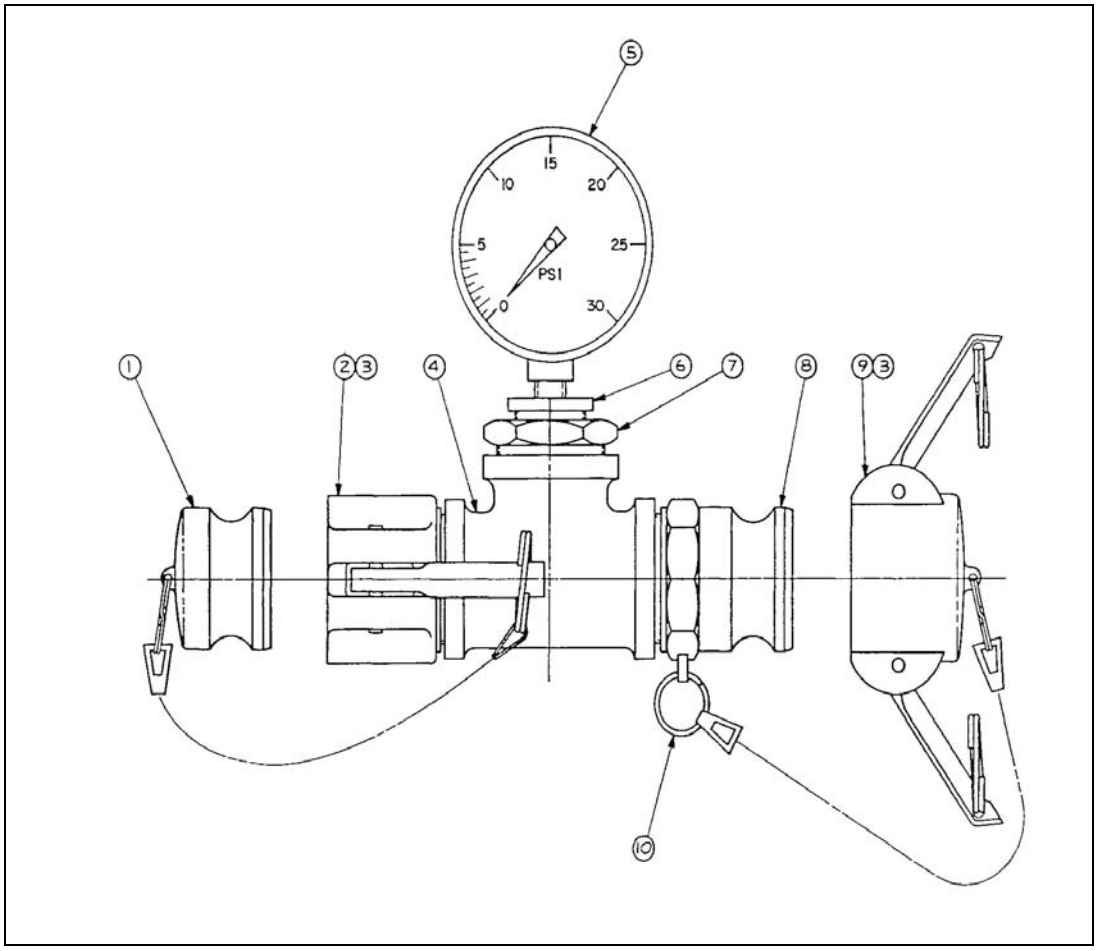
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
15	1	PDOOO	4730-01-415-6403	13229E7170	Plug Quick Disconnect	1	EA	S9C
15	2	PDOOO	4730-00-980-9411	MS27024-9	Coupling Half Quick Disconnect 1 1/2"F w/NPT	1	EA	S9C
15		PAO-Z	5330-00-088-9167	MS27030-3	Gasket	1	EA	S9I
15	3	PDOOO	4730-00-858-3490	MIL-F-52618/8	Bushing, Pipe	1	EA	S9C
15	4	XA--Z		13229E7193-1	Nipple, Pipe	1	EA	
15	5	PDOOO	5340-00-804-5230	MIL-C-5501/6	Cap, Protective	1	EA	S9I
15	6	PAO-Z	4730-00-649-9100	13229E7191-13	Cap, Quick Disconnect, 2"	1	EA	S9C
15		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA
15		PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	3	EA	S9I

SECTION 2 – REPAIR PARTS LISTS
Adapter, Straight Hose to Boss
Figure D-16



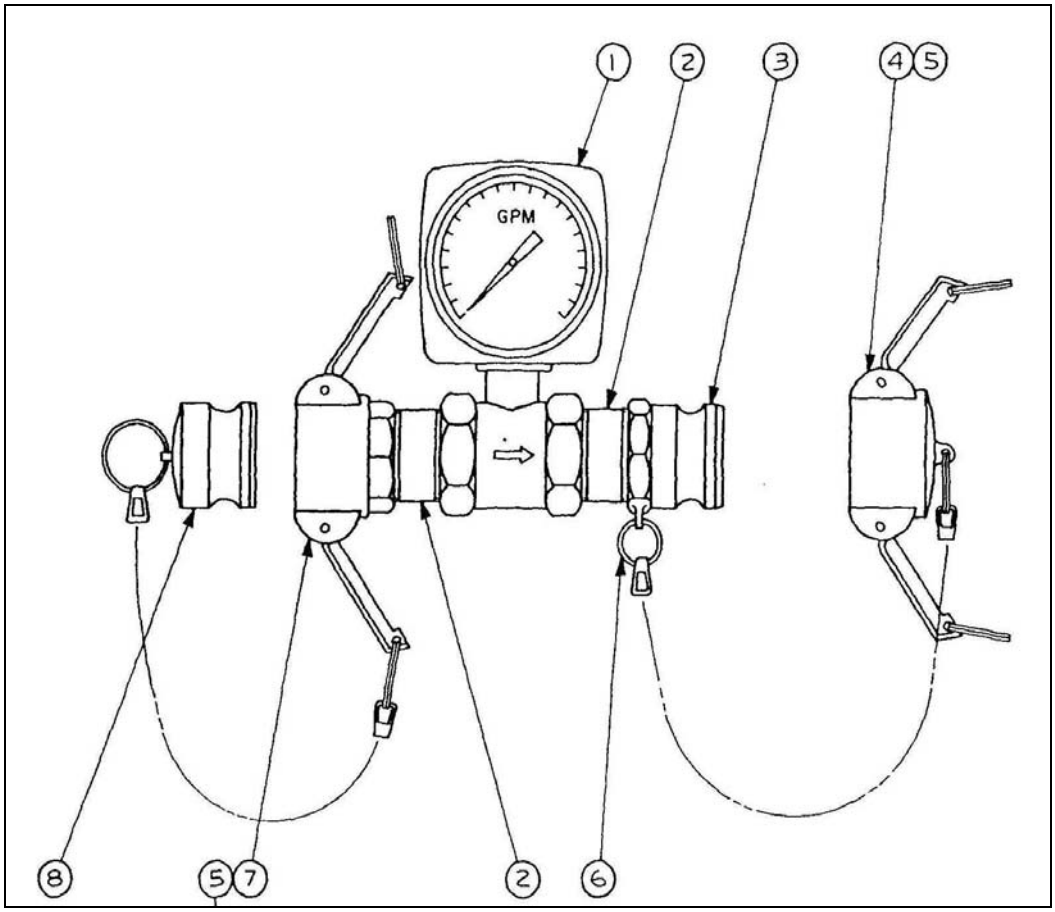
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
16	1	PAO-Z	4730-01-415-6420	13229E7195	Adapter, Straight Hose to Boss	1	EA	A12

SECTION 2 – REPAIR PARTS LISTS
Pipe Assembly, Potable Water
Figure D-17



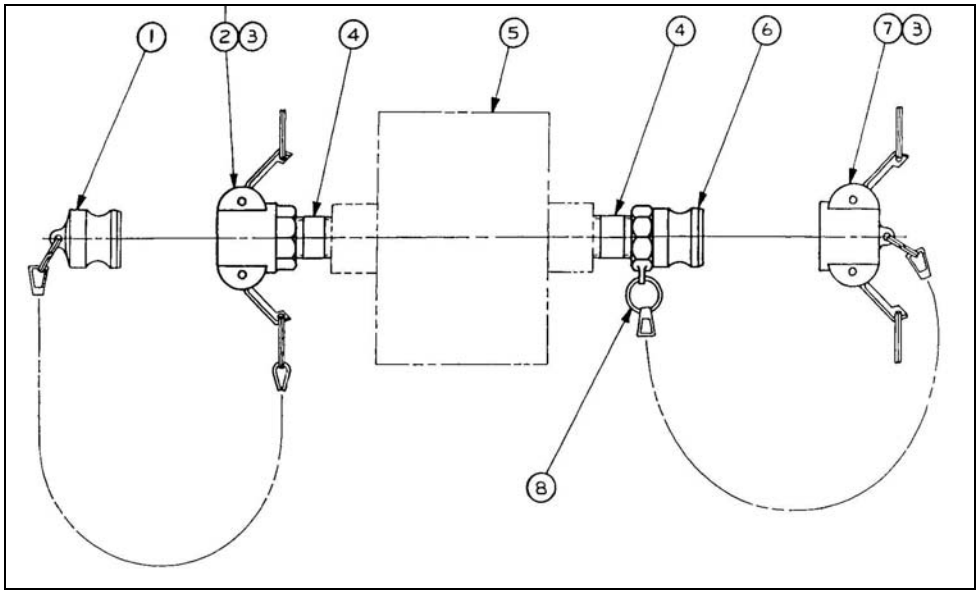
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
17		PDOOO	4610-01-440-4086	13229E7162	Pipe Assembly, Potable Water	1	EA	S9C
17	1	PDOOO	4730-00-968-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	1	EA	S9C
17	2	PDOOO	4730-00-203-1010	MS27026-9	Coupling Half Quick Disconnect 1 1/2"F w/M NPT	1	EA	S9C
17	3	PAO-Z	5330-00-360-0595	MS27030-5	Gasket	2	EA	S9I
17	4	XA--Z	4730-01-440-0038	13229E7191	Tee, Pipe	1	EA	S9C
17	5	XA--Z	6685-00-764-3056	J0042E	Gauge, Pressure Dial, 0-30 PSI	1	EA	S9G
17	6	XA--Z			Bushing, Pipe Reducer	1	EA	
17	7	PDOOO	4730-00-196-0899	WWP471	Bushing, Pipe 1 1/2" x 1"	1	EA	S9C
17	8	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2" M w/M NPT	1	EA	S9C
17	9	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M w/M NPT	1	EA	S9C
17	10	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	7	EA	S9I
17		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Pipe Assembly, Potable Water
Figure D-18



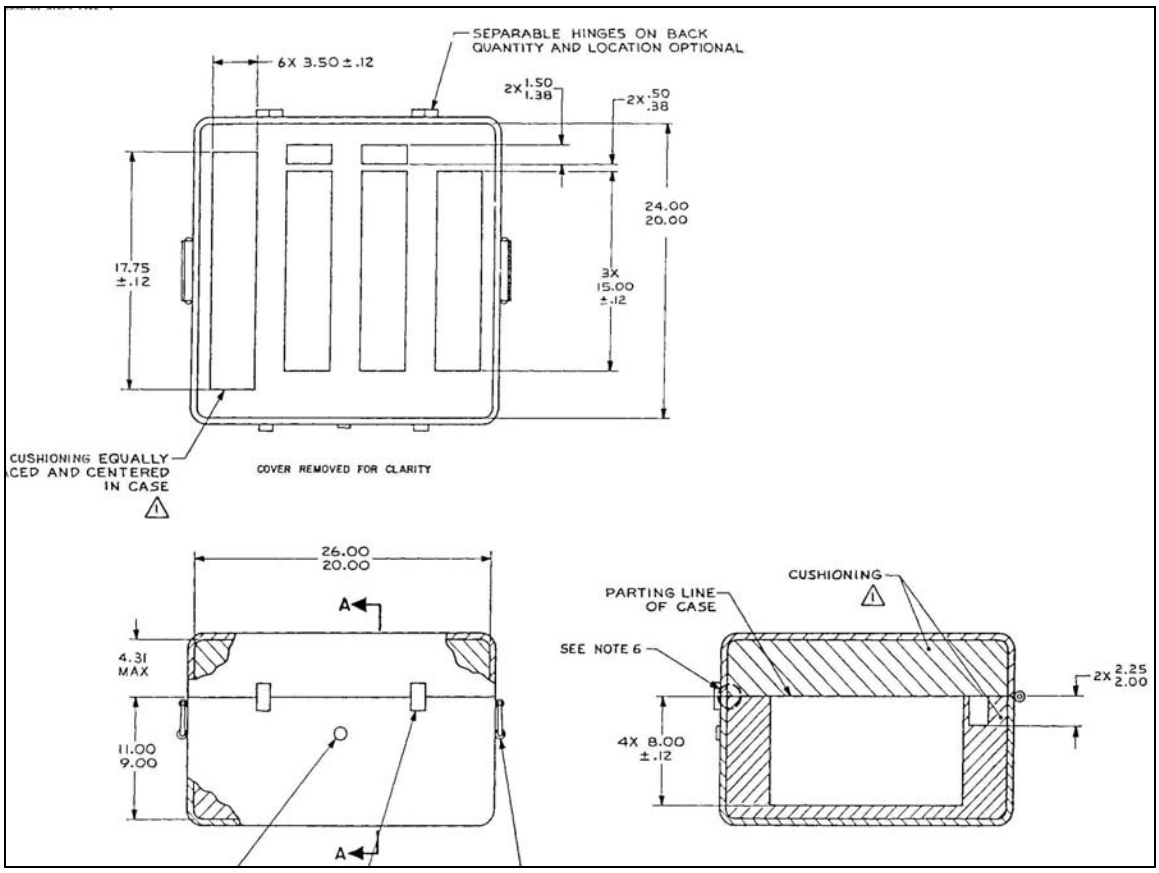
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
18		PDOOO	4610-01-440-4088	13229E7165	Pipe Assembly Potable Water	1	AY	S9C
18	1	XA--Z			Flowmeter	1	EA	
18	2	XA--Z			Tee, Pipe	1	EA	
18	3	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M w/M NPT	1	EA	S9C
18	4	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	1	EA	S9C
18	5	PAO--Z	5330-00-360-0595	MS27030-5	Gasket	2	EA	S9I
18	6	PAO--Z	5325-00-926-5411	H01434M	Ring, Retaining	7	EA	S9I
18	7	PDOOO	4730-00-203-1010	MS27026-9	Coupling Half Quick Disconnect 1 1/2"F w/M NPT	1	EA	S9C
18	8	PDO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	1	EA	S9C
18		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antisiezing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Indicator Assembly
Figure D-19



(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
19		PDOOO	4610-01-440-4090	13229E7163	Indicator Assembly	1	AY	S9C
19	1	PDO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	1	EA	S9C
19	2	PDOOO	4730-00-203-1010	MS27026-9	Coupling Half Quick Disconnect 1 1/2"F w/M NPT	1	EA	S9C
19	3	PAO-Z	5330-00-360-0595	MS27030-5	Gasket	2	EA	S9I
19	4	PAO-Z	4730-01-440-0076	13229E7191-23	Bushing, Pipe 1 1/2" to 1"	2	EA	S9C
19	5	XA--Z			Indicator	1	EA	
19	6	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M w/M NPT	1	EA	S9C
19	7	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	1	EA	S9C
19	8	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	7	EA	S9I
19		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antiseizing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Case, Electrical-Electronic Test
Figure D-20

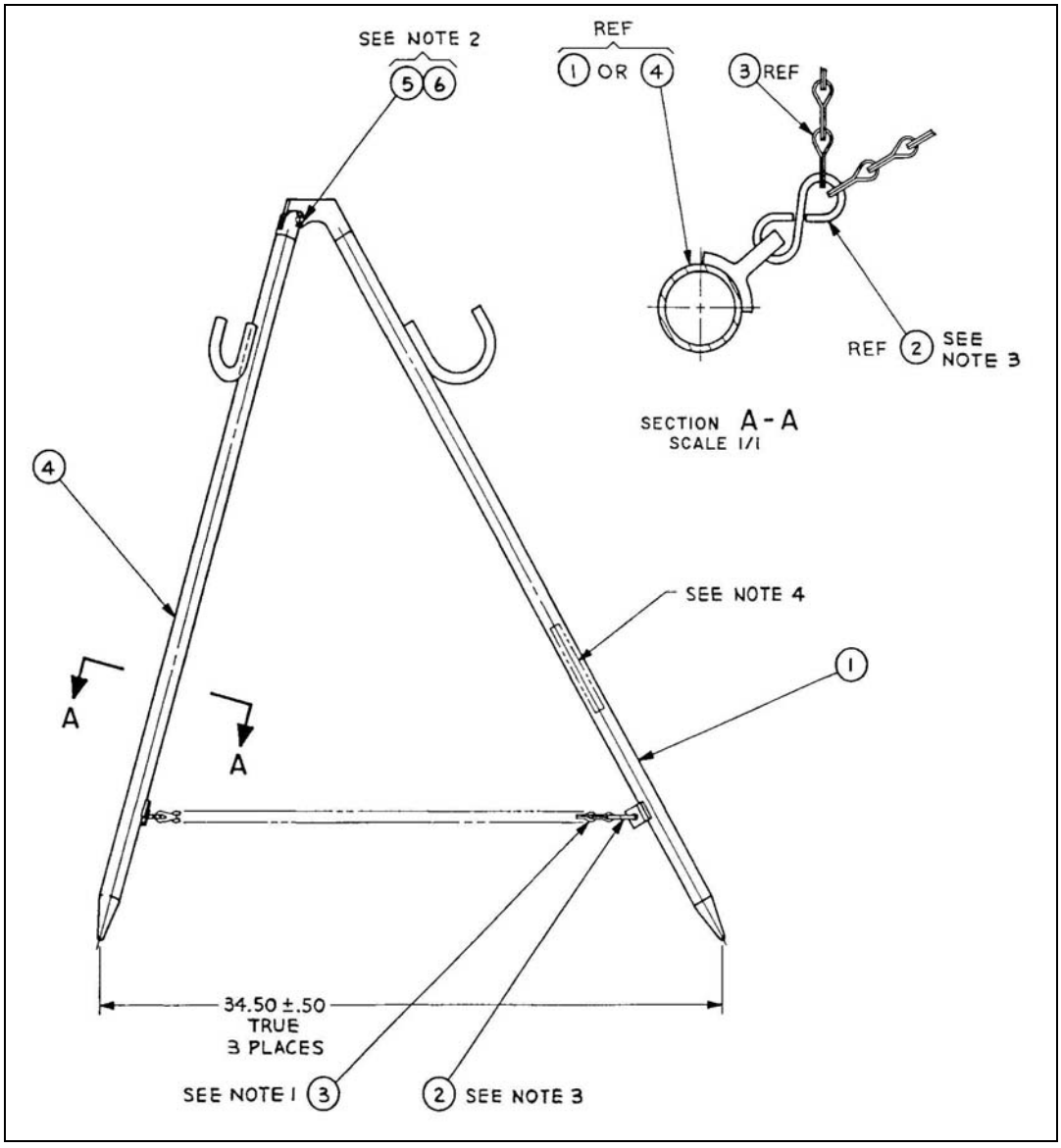


	(1)							
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
20	1	PR--Z	6625-01-449-2857	13229E7189	Case, Electrical-Electronic Test	1	EA	S9M

Replaced by

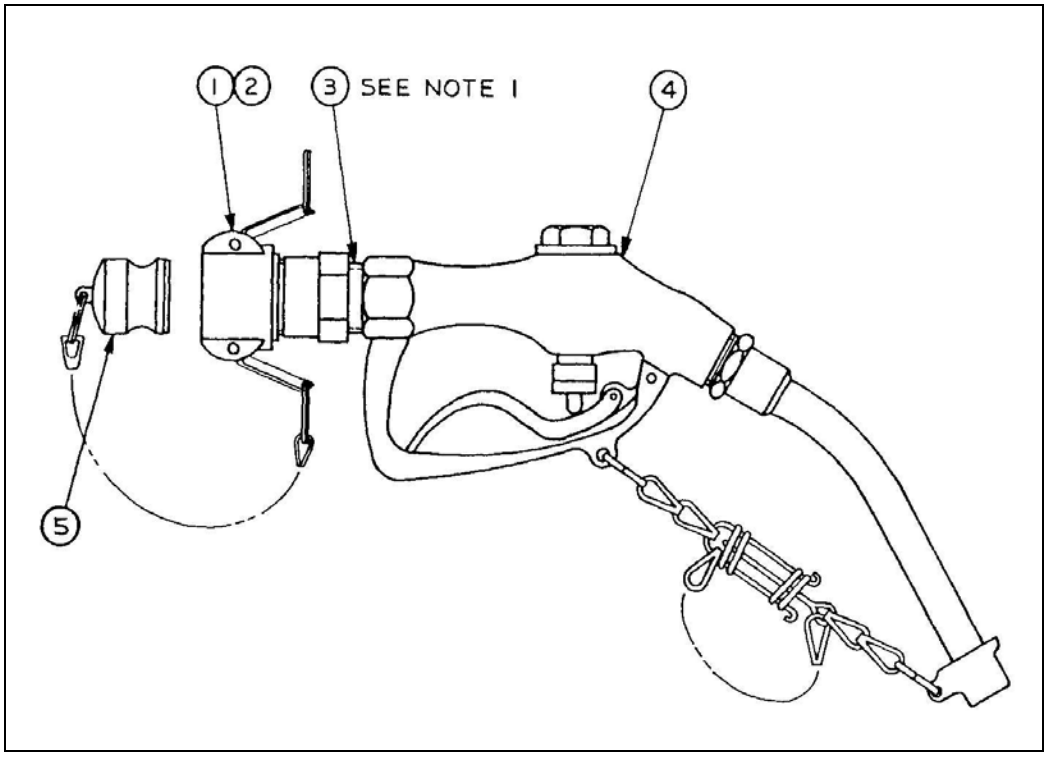
	(1)							
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
20	1	PDOOO	6545-01-499-5676	15678-200	Case, Medical Supply and Instrument	1	EA	S9M

SECTION 2 – REPAIR PARTS LISTS
Stand Assembly, Distribution Nozzle
Figure D-21



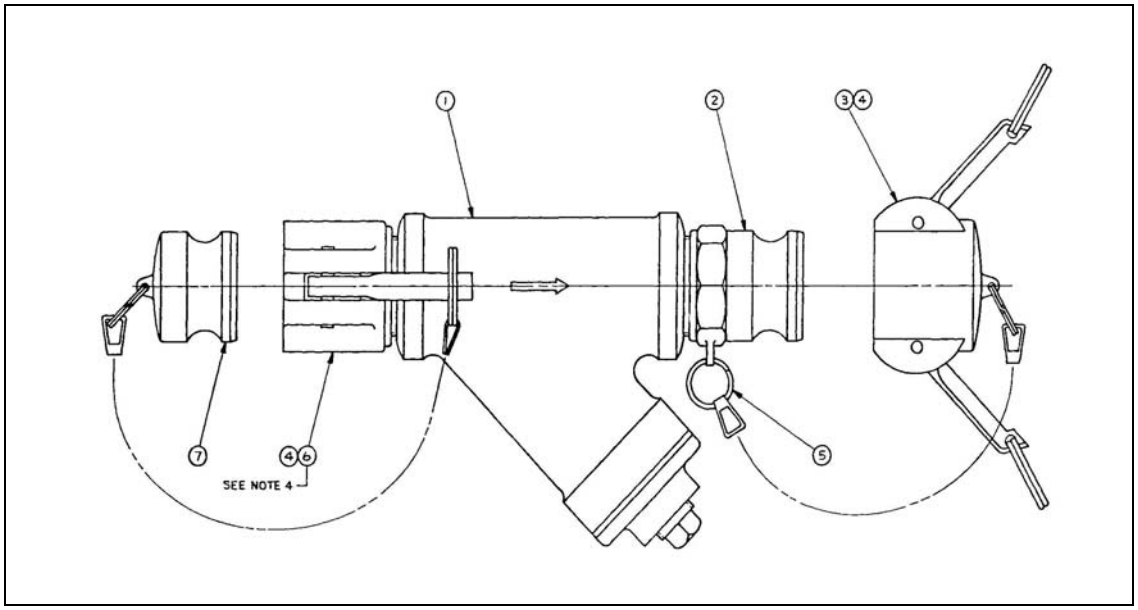
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
21	1	PDOOO	4930-01-120-7426	13225E9140	Stand Assembly Distribution Nozzle	1	EA	S9I

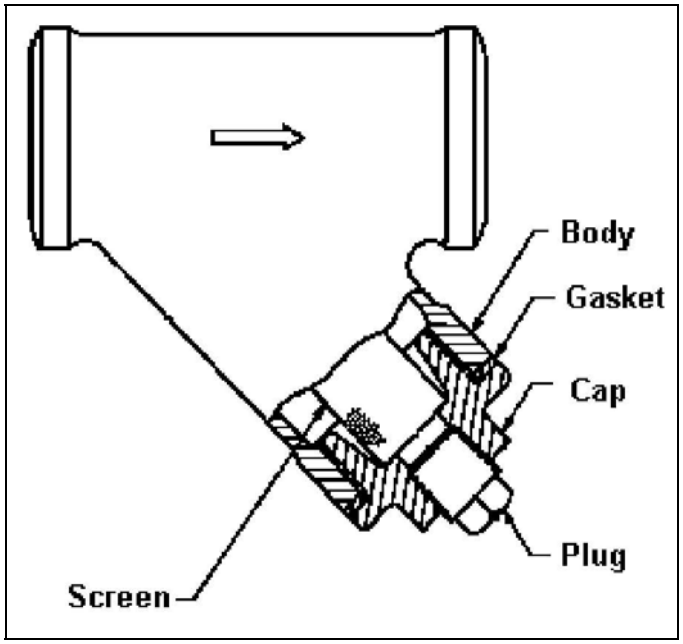
SECTION 2 – REPAIR PARTS LISTS
Nozzle Assembly, Water
Figure D-22



(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
22		PDOOO	4610-01-440-6834	13229E7168	Nozzle Assembly Water	1	AY	S9C
22	1	PDOOO	4730-00-042-5265	MS27024-5	Coupling Half Quick Disconnect 1"F w/F NPT	1	EA	S9C
22	2	PAO-Z	5330-00-088-9167	MS27030-4	Gasket	1	EA	S9I
22	3	XA--Z			Bushing Pipe	1	EA	
22	4	XA--Z			Nozzle, Water	1	EA	
22		PAO-Z	8030-00-889-3535	A-A-58092	Tape, Antiseizing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Strainer, Sediment
Figure D-23





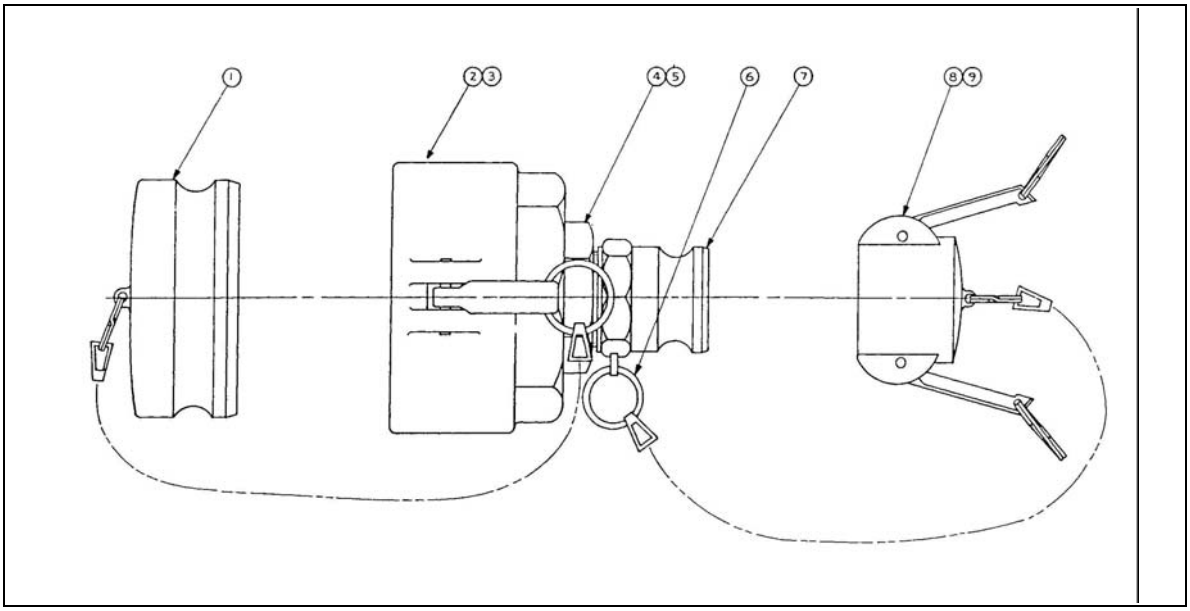
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
23		PDOOO	4730-01-440-7662	13229E7180	Strainer Assembly	1	EA	S9C
23	1	PAO-Z	4730-01-440-9103	13229E7179	Strainer, Sediment	1	EA	S9C
23	2	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M NPT	1	EA	S9C
23	3	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	1	EA	S9C
23	4	PAO-Z	5330-00-360-0595	MS27030-5	Gasket	1	EA	S9I
23	5	PAO-Z	5325-00-926-5411	H01434M	Ring, Retaining	5	EA	S9I
23	6	PDOOO	4730-00-980-9411	MS27024-9	Coupling Half Quick Disconnect 1 1/2"F NPT	1	EA	S9C
23	7	PAO-Z	4730-00-823-5316	MS27029-9	Plug, Quick Disconnect 1 1/2"	1	EA	S9C
23		PAO-Z	8030-00-889-3534	A-A-58092	Tape, Antiseizing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS
Cage, Wire, Folding
Figure D-24

(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
24	1	PD--Z	3990-01-505-5922	W-2-404-836-SP-SJF	Cage, Wire Folding	1	EA	LP

SECTION 2 – REPAIR PARTS LISTS

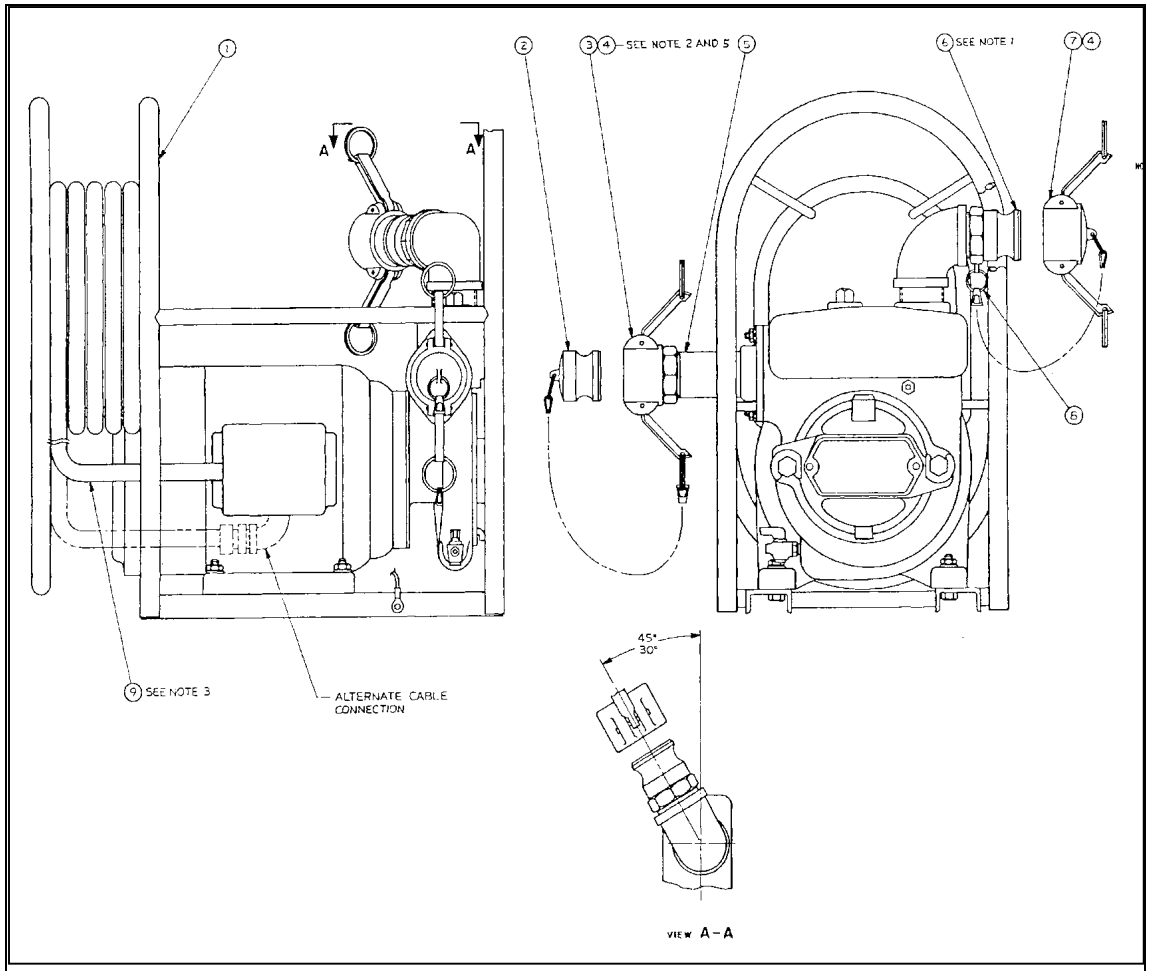
Adapter Assembly, Quick Disconnect
4 Inch Female to 1½ Inch Male
Figure D-25



(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
25		PDOOO	4730-01-445-5188	13229E7190	Adapter Assembly Quick Disconnect 4"F to 1 1/2"M	1	EA	S9C
25	1	PDO-Z	4730-00-640-6188	MS27029-17	Plug, Quick Disconnect 4"	1	EA	S9C
25	2	PDOOO	4730-01-020-4763	MS27024-17	Coupling Half Quicj Disconnect	1	EA	S9C
25	3	PAO-Z	5330-00-899-4509	MS27030-9	Gasket	1	EA	S9I
25	4	XA--Z	4730-01-440-0080	13229E7191-24	Fitting, Pipe	1	EA	S9C
25	5	PAO-Z	8030-00-889-3534	H01434M	Tape, Antiseizing	V	AR	GSA
25	6	PAO-Z	5325-00-926-5411	A-A-58092	Ring, Retaining	6	EA	S9I
25	7	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half Quick Disconnect 1 1/2"M w/M NPT	1	EA	S9C
25	8	PDOOO	4730-00-869-5246	MS27028-9	Cap, Quick Disconnect 1 1/2"	1	EA	S9C
25	9	PAO-Z	5330-00-360-0595	MS27030-5	Gasket	1	EA	S9I

SECTION 2 – REPAIR PARTS LISTS

Pump Assembly, Centrifugal
65 GPM
Figure D-26



(1)

(a) FIG NO	(b) ITEM NO	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI
26		4320-01-440-4421	13229E7159	Pump Assembly, Centrifugal	2	EA

SECTION 2 – REPAIR PARTS LISTS
Heater, Water, 9,000 Watts
Figure D-27

(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR	NSN	PART NO.	DESCRIPTION	QTY	UI	SOS
27		PDOOO	4520-01-493-7423	111739	Heater, Water, Electric, 9,000 Watts	12	EA	S9M

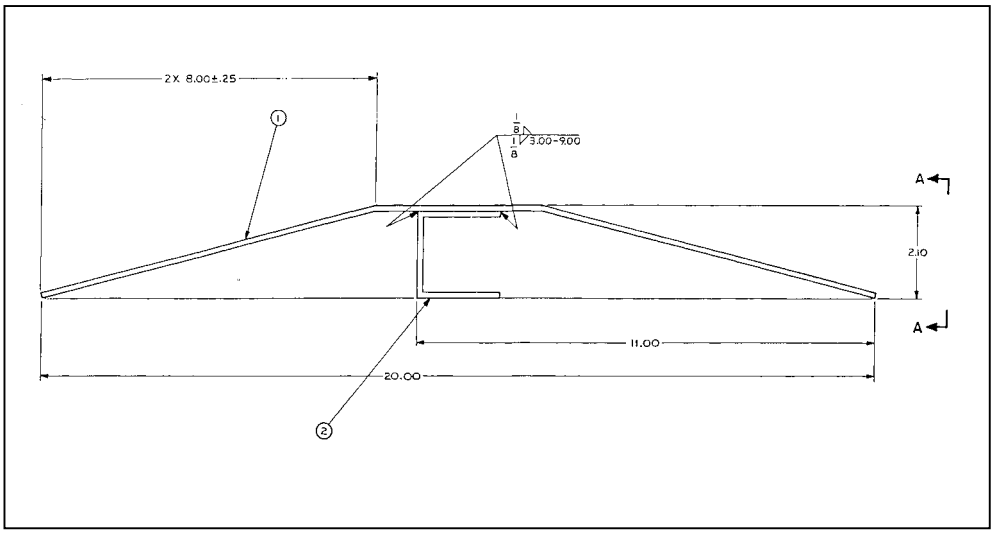
SECTION 2 – REPAIR PARTS LISTS

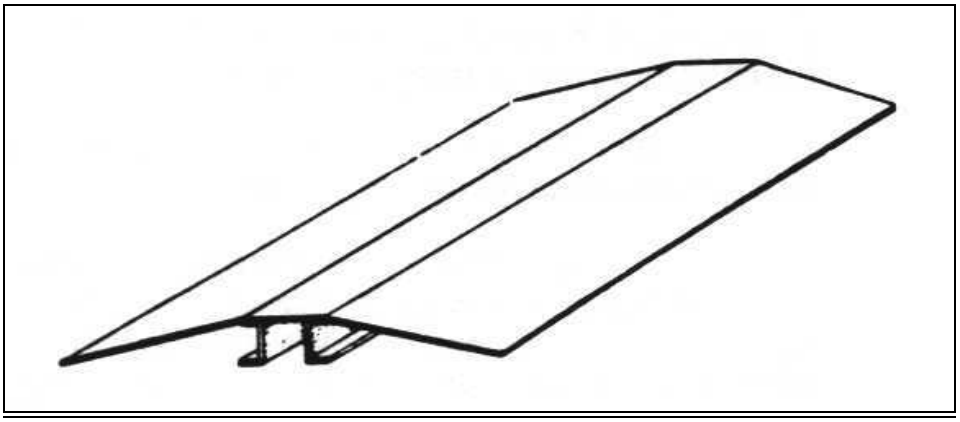
Hypochlorination Unit
Figure D-28

(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR	NSN	PART NO.	DESCRIPTION	QTY	UI	SOS
28		PDOOO	4610-01-435-4884	WAL-1031-96	Hypochlorination Unit	1	EA	A12
28		PC—Z	6810-01-358-4336	13229E0923	Sodium Hypochlorinite Technical	6	BG	S9G

SECTION 2 – REPAIR PARTS LISTS

Channel. Hose Protector, Surface
Figure D-29



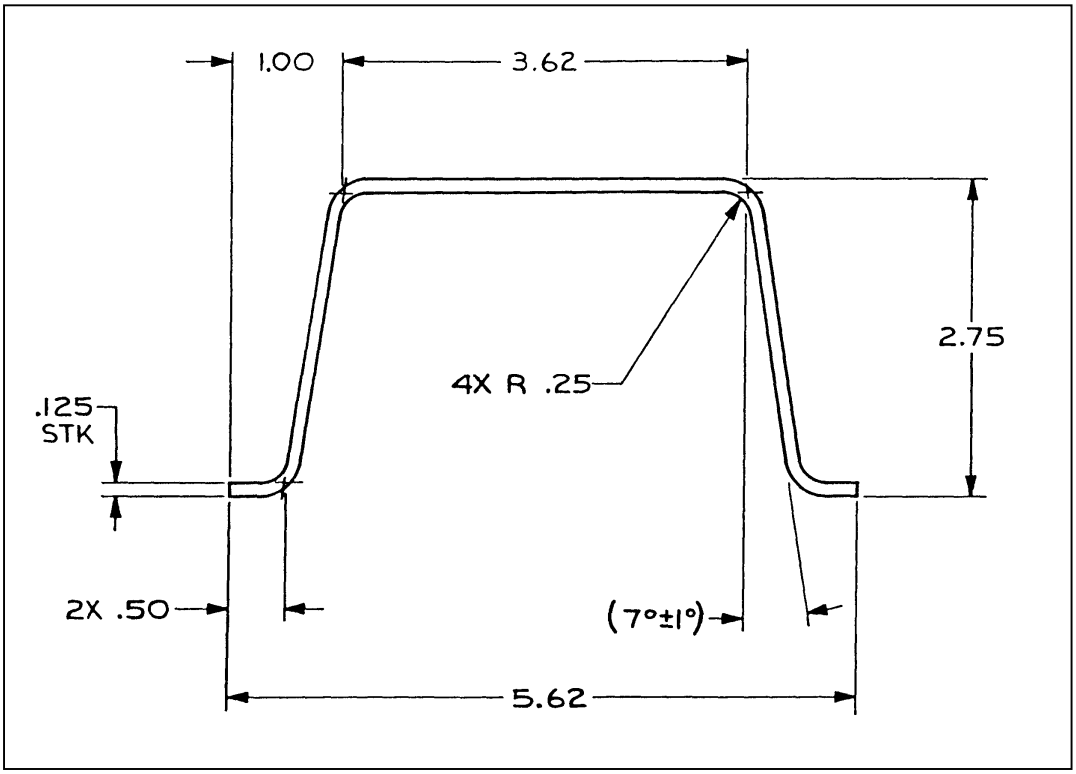


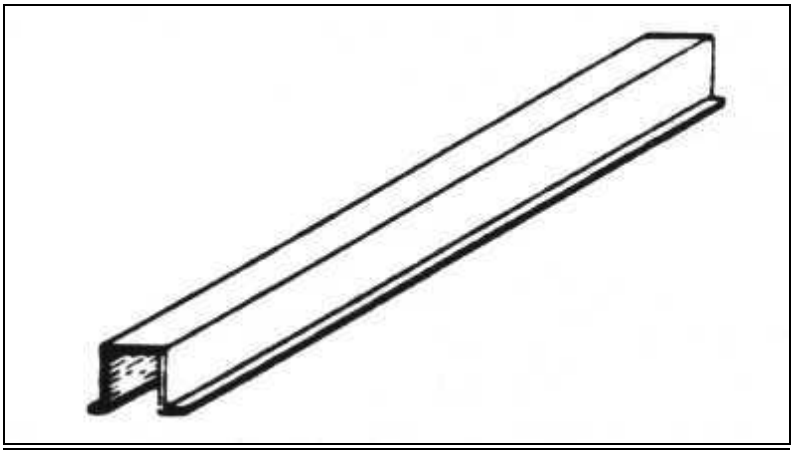
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR	NSN	PART NO.	DESCRIPTION	QTY	UI	SOS
29		PD--Z	4720-01-440-4925	13229E7176	Channel, Hose Protector, Surface	10	AY	S9C

SECTION 2 – REPAIR PARTS LISTS

Channel. Hose Protector, Subsurface

Figure D-30

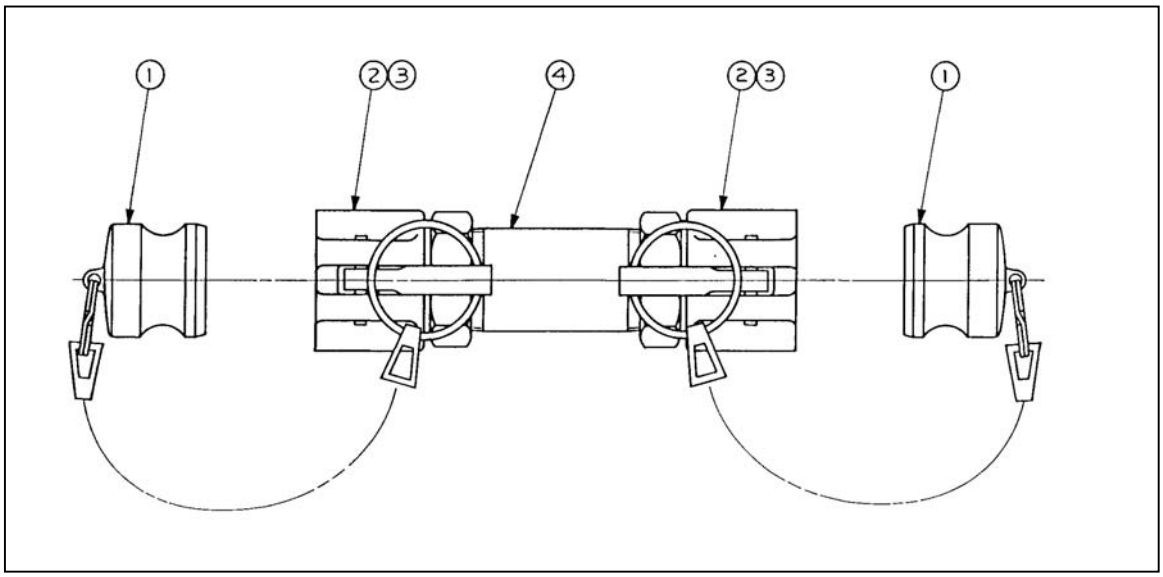




(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR	NSN	PART NO.	DESCRIPTION	QTY	UI	SOS
30		PD--Z	4720-01-440-4928	13229E7175	Channel, Hose Protector, Subsurface	5	AY	S9C

SECTION 2 – REPAIR PARTS LISTS

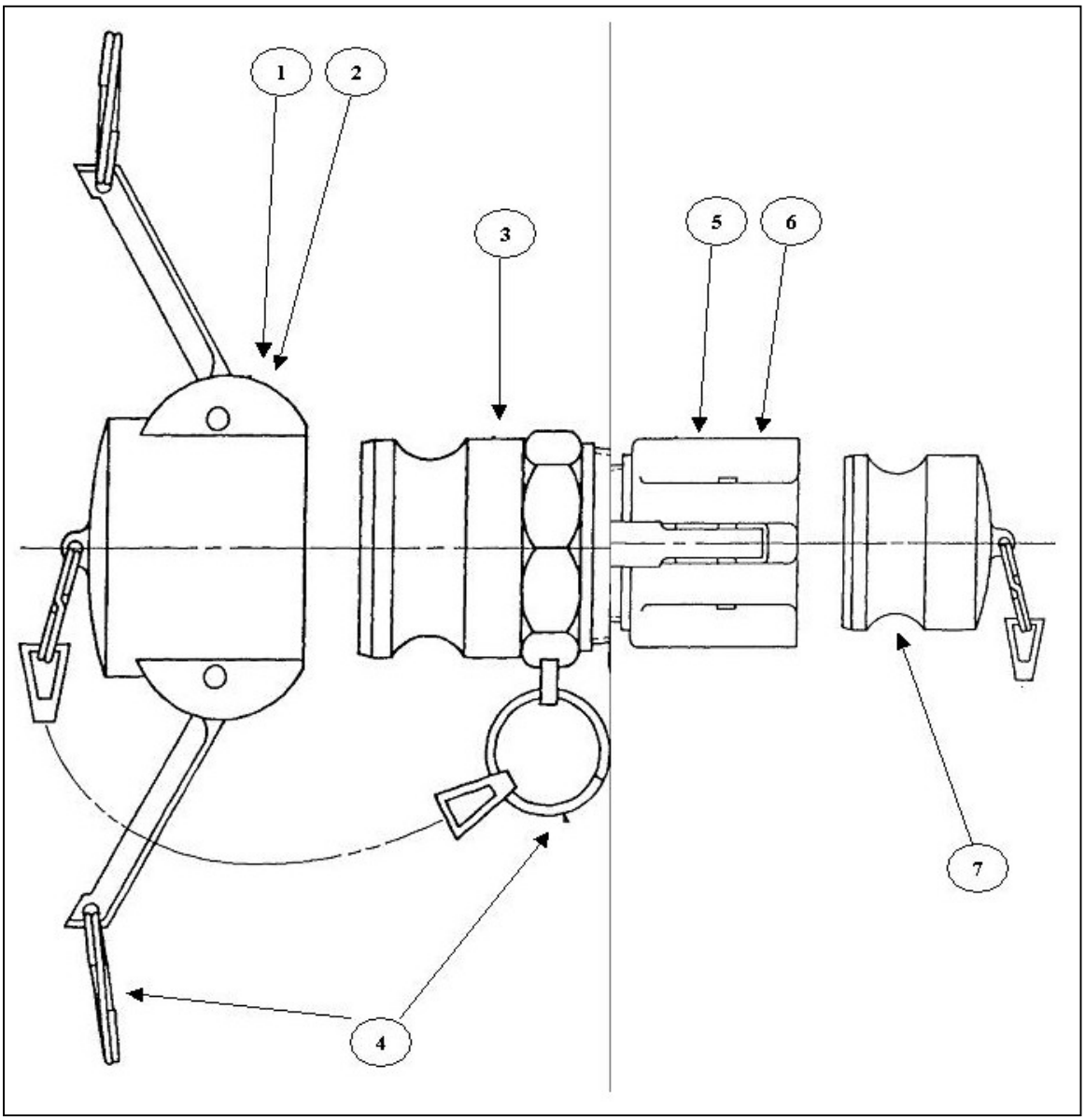
Coupling Assembly, Quick Disconnect
1-Inch Female x 1-Inch Female
Figure D-31



(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR	NSN	PART NO.	DESCRIPTION	QTY	UI	SOS
31		PDOOO	4730-01-440-8569	13229E7173	Coupling Assembly, QD	1	EA	S9C
31	1	PDO--Z	4730-00-360-0715	MS27029-5	Plug, QD, 1”	2	EA	S9C
31	2	PDOOO	4730-00-042-5265	MS27024-5	Coupling Half, QD, 1”F with F NPT	2	EA	S9C
31	3	PAO-Z	5330-00-088-9167	MS27030-4	Gasket	2	EA	S9I
31	4	XA--Z			Pipe, 1” Threaded (Male)	1	EA	

SECTION 2 – REPAIR PARTS LISTS

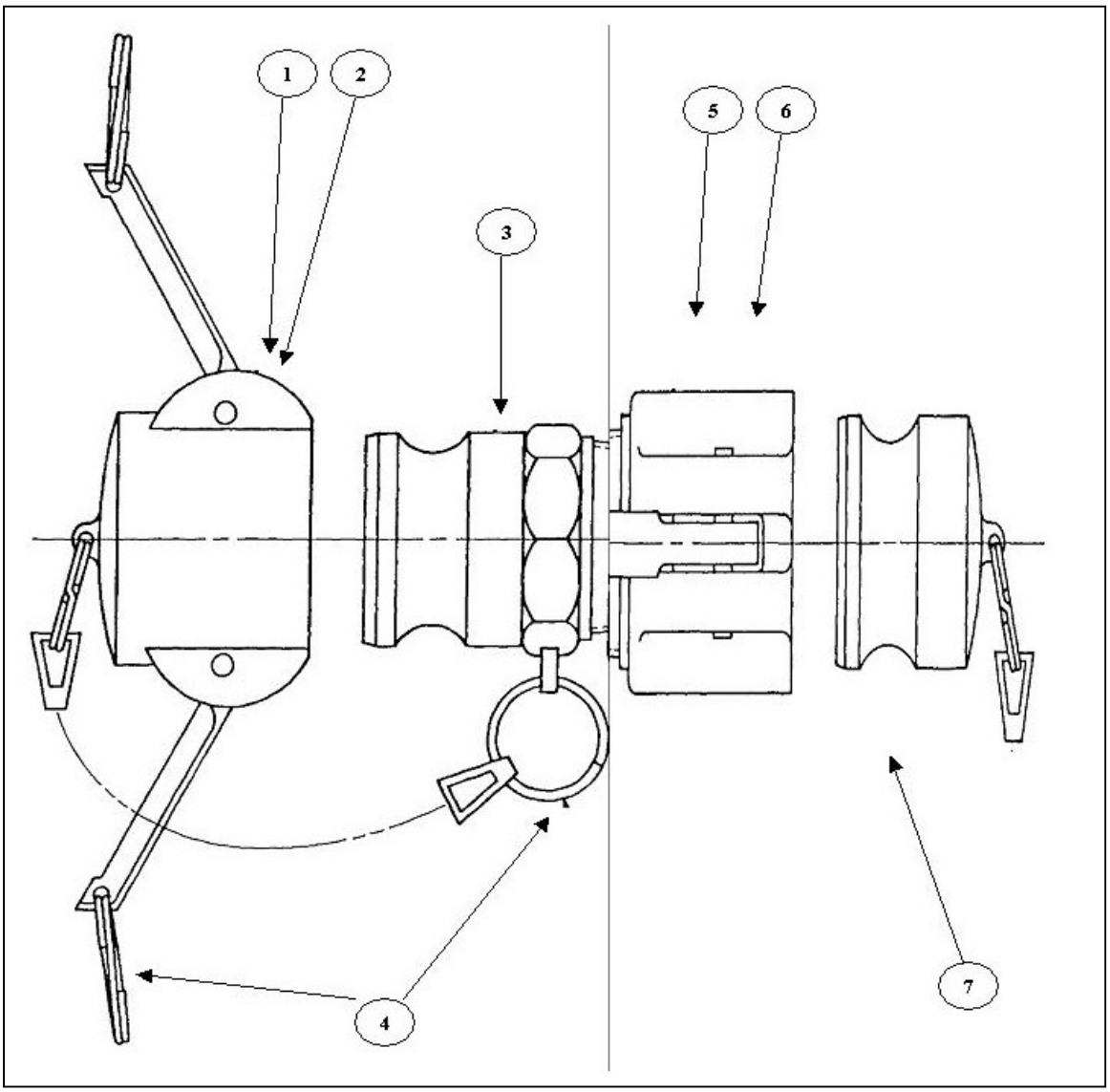
Reducer, Quick Disconnect
1 ½ Inch Male to 1-Inch Female
Figure D-32



(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR	NSN	PART NO.	DESCRIPTION	QTY	UI	SOS
32		PDOOO	4730-01-499-8752	3629	Reducer, QD, 1”F to 1 ½”M	1	EA	S9M
32	1	PDOOO	4730-00-869-5246	MS27028-9	Cap, QD 1 ½”	1	EA	S9C
32	2	PAO--Z	5330-00-360-0595	MS27030-5	Gasket 1-1/2”	1	EA	S9I
32	3	PDOOO	4730-00-360-0589	MS27022-9	Coupling Half, QD, 1-1/2”M with Male NPT	1	EA	S9C
32	4	PAO-Z	5325-00-926-5411	A-A-58092	Ring, Retaining	5	EA	S9I
32	5	PDO-Z	4730-00-360-0715	MS27029-5	Coupling Half, QD, 1-1/2”F with Female NPT	1	EA	S9C
32		PAO-Z	8030-00-889-3534	H01434M	Tape, Antiseizing	V	AR	GSA

SECTION 2 – REPAIR PARTS LISTS

Reducer, Quick Disconnect
1-Inch Male to 1 ½ Inch Female
Figure D-33



(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR	NSN	PART NO.	DESCRIPTION	QTY	UI	SOS
33		PDOOO	4730-01-499-8787	3630	Reducer, QD, 1-1/2"F to 1"M	1	EA	S9M
33	1	PDOOO	4730-00-360-0791	MS27028-5	Cap, QD 1"	1	EA	S9C
33	2	PAO-Z	5330-00-089-9167	MS27030-4	Gasket 1"	1	EA	S9I
33	3	PDOOO	4730-00-084-7435	MS27022-5	Coupling Half, QD, 1"M with Male NPT	1	EA	S9C
33	4	PAO-Z	5325-00-926-5411	A-A-58092	Ring, Retaining	5	EA	S9I
33	5	PDO-Z	4730-00-980-9411	MS27024-9	Coupling Half, QD, 1-1/2"F with Female NPT	1	EA	S9C
33	6	PAO-Z	5330-00-360-0595	MS27030-5	Gasket, 1-1/2"	1	EA	S9I
33	7	PDOOO	4730-00-823-5316	MS27029-9	Plug, QD 1-1/2"	1	EA	S9C
33		PAO-Z	8030-00-889-3534	H01434M	Tape, Antiseizing	V	AR	GSA

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APPENDIX E
ORGANIZATIONAL MAINTENANCE
REPAIR PARTS AND COMPONENTS
WASTEWATER MANAGEMENT SET, HOSPITAL, DEPMEDS

SECTION 1. INTRODUCTION

E-1. Scope. This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for the performance of organizational maintenance of the Water Distribution Set, Hospital, DEPMEDS.

E-2. General. In addition to Section 1, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. Section 2 – Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of parts, with the components of each part listed in ascending figure and item number sequence. Bulk materials are listed by item name in FIG BULK at the end of the section.

b. Section 3 – Special Tools List. Not applicable.

c. Section 4 – Cross reference Indexes. Not applicable.

E-3. Explanation of Columns (Section 2).

a. FIG NO. (Column 1a). This column lists the number of the figure where the item is identified/located.

b. ITEM NO. (Column 1b). Indicates the number used to identify items called out in the illustration.

c. SMR Code.(Column 2).

(1) *Source Code* (2 positions). Codes are entered in the first and second positions of the SMR indicating the source for replacement purposes, i.e., procured and stocked, manufactured or assembled.

Code	Explanation
PA	Item procured and stocked for anticipated or known usage. Items are normally considered for replenishment.
PB	Item procured and stocked for insurance purposes because essentiality dictates that a quantity be available in the supply system.
PC	Item procured and stocked but is deteriorative in nature.

Code	Explanation
PD	Support item, excluding support equipment, procured for initial issue and stocked only for subsequent or additional initial issues. Not subject to automatic replenishment.
PE	End item and/or support equipment procured and stocked for initial issue for specific maintenance activities
PF	Support equipment which will not be stocked but which will be centrally procured on demand.
PG	Item procured and stocked to provide for sustained support for the life of the equipment. It is applied to an item that, because of probable discontinuance or shutdown of production facilities would prove uneconomical to reproduce at a later time.
PH	Item procured and stocked and has been identified to contain hazardous materiel, item requires recordation in the Hazardous Materiel Information System (HMIS) and a Materiel Safety Data Sheet (MSDS).
PR	End item and/or support item, terminal or obsolete and replaced. No longer authorized for procurement. On hand assets may be issued until exhausted. Then use replacement item.
PZ	Item terminal or obsolete with no replacement, discontinue use.
KD	An item contained in a depot overhaul/repair kit and not purchased separately. Depot kit defined as a kit that provided items required at the time of depot overhaul or repair.
KF	An item contained in a maintenance kit and not purchased separately. Maintenance kit defined as a kit that provides an item that can be replaced at organizational or intermediate levels of maintenance.
KB	Item included in both a depot overhaul/repair kit and a maintenance kit.
MO	Item to be manufactured or fabricated at organizational level.
MF	Item to be manufactured or fabricated at DS level.
MH	Item to be manufactured or fabricated at GS level.
MD	Item to be manufactured or fabricated at depot level.
AO	Item to be assembled at organizational level.
AF	Item to be assembled at DS level.
AH	Item to be assembled at GS level.
AD	Item to be assembled at depot level.
XA	Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly.
XB	Support item with low mortality rate, not procured or stocked.
XC	Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD	Support item with low mortality rate, not stocked. Local purchase or requisition through normal supply channels.

(2) *Maintenance Code* (2 positions).

(a) General. Maintenance codes are assigned to indicate the levels of maintenance authorized to USE, REMOVE, REPLACE, or REPAIR support items. The maintenance codes are entered in the third and fourth positions are as follows:

(b) USE (third position). This position will indicate the lowest maintenance level authorized to remove, replace and use the support item.

Code	Explanation
O	Support item is removed, replaced, used at the organizational level of maintenance.
F	Support item is removed, replaced, used at the DS level.
Code	**Explanation**
H	Support item is removed, replaced, used at the GS level.
K	Repairable item. Item is removed, replaced or used at contractor facility.
D	Item is removed, replaced or used at Depot level only.

(b) REPAIR (fourth position). This position will indicate whether the item is to be repaired and identifies the lowest maintenance level with the capabilities to perform complete repair. This code will only be used if the first position of the SMR code is “P”. When a maintenance code is not used a date “-“ sign will be entered.

Code	Explanation
O	Maintenance at the organizational level of maintenance.
F	Maintenance at the DS level.
H	Maintenance at the GS level.
K	Repairable item. Item is repaired at contractor facility.
D	Repair at Depot level only.

(3) *Recoverability Code* (1 position). Code entered in the fifth position indicates the desired disposition of the support item.

Code	Explanation
Z	Non-repairable item. When item becomes unserviceable, condemn and dispose of at authorized level.
O	Repairable item. When uneconomically repairable, condemn and dispose at organization level.
F	Repairable item. When uneconomically repairable, condemn and dispose at DS level.
H	Repairable item. When uneconomically repairable, condemn and dispose at GS level.
K	Repairable item. Condemnation and dispose at Contractor facility.
D	Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L	Repairable item. Condemnation and disposal not authorized below depot level.

d. NSN (Column 3). The National Stock Number which is used to identify the item.

e. PART NUMBER (Column 4). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity) that controls the design, specifications, standards, and inspection requirements to identify an item or range of items.

f. DESCRIPTION (Column 5). This column contains the following information:

(1) The Federal Item name and, when required, a minimum description to identify the item.

(2) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.

(3) Part numbers for bulk materials are references in this column in the line item entry for the item to be manufactured/fabricated.

(4) The usable on code. Not applicable.

g. QTY (Column 6). The QTY (quantity per figure column) indicates the quantity of the item used in the illustration figure. A “V” appearing in this column in lieu of a quantity indicates that the quantity is variable and quantity may vary from application to application.

h. UI (Column 7). The UI (Unit of Issue) indicates the unit of issue of the item used in the illustrated figure. A “AR” appearing in this column in lieu of a unit of issue indicates that the unit is as required and may vary from application to application.

i. SOS (Column 8). The SOS (Source of Supply) indicates the source from which the part may be ordered.

E-4. Explanation of Columns (Section 4). Not applicable.

E-5. Special Information. Not applicable.

E-6. How to Locate Repair Parts.

a. When NSN or Part Number is Not Known.

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) Second. Find the figure covering the assembly group of subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and use the corresponding table to find the NSN or Part Number.

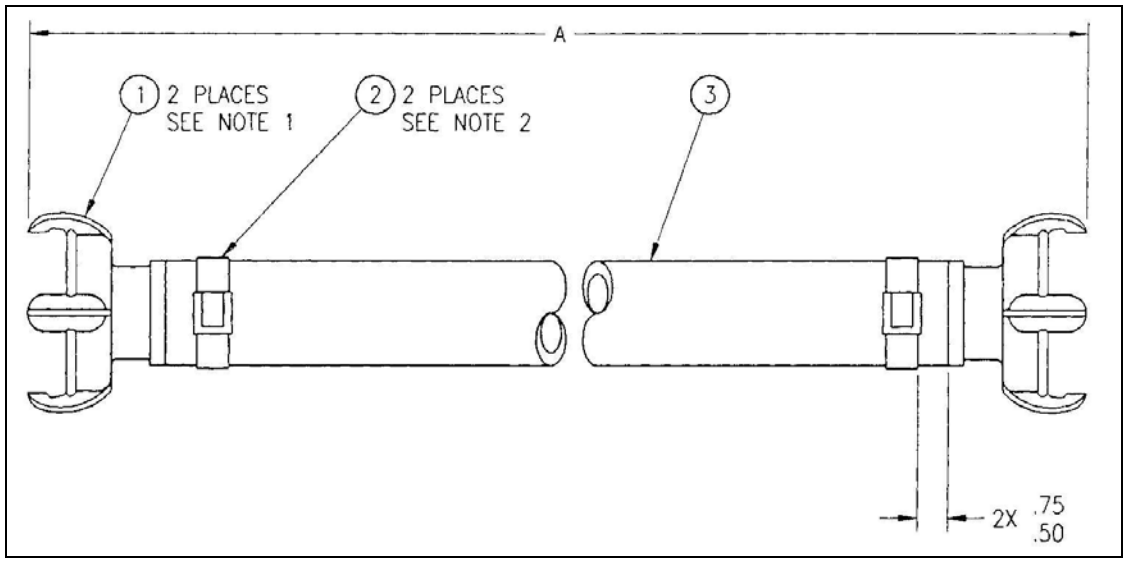
b. When NSN or Part Number is Known. Not applicable.

E-7. Abbreviations. Not applicable.

SECTION 2 – REPAIR PARTS LISTS
Cage, Wire, Folding
Figure E-1

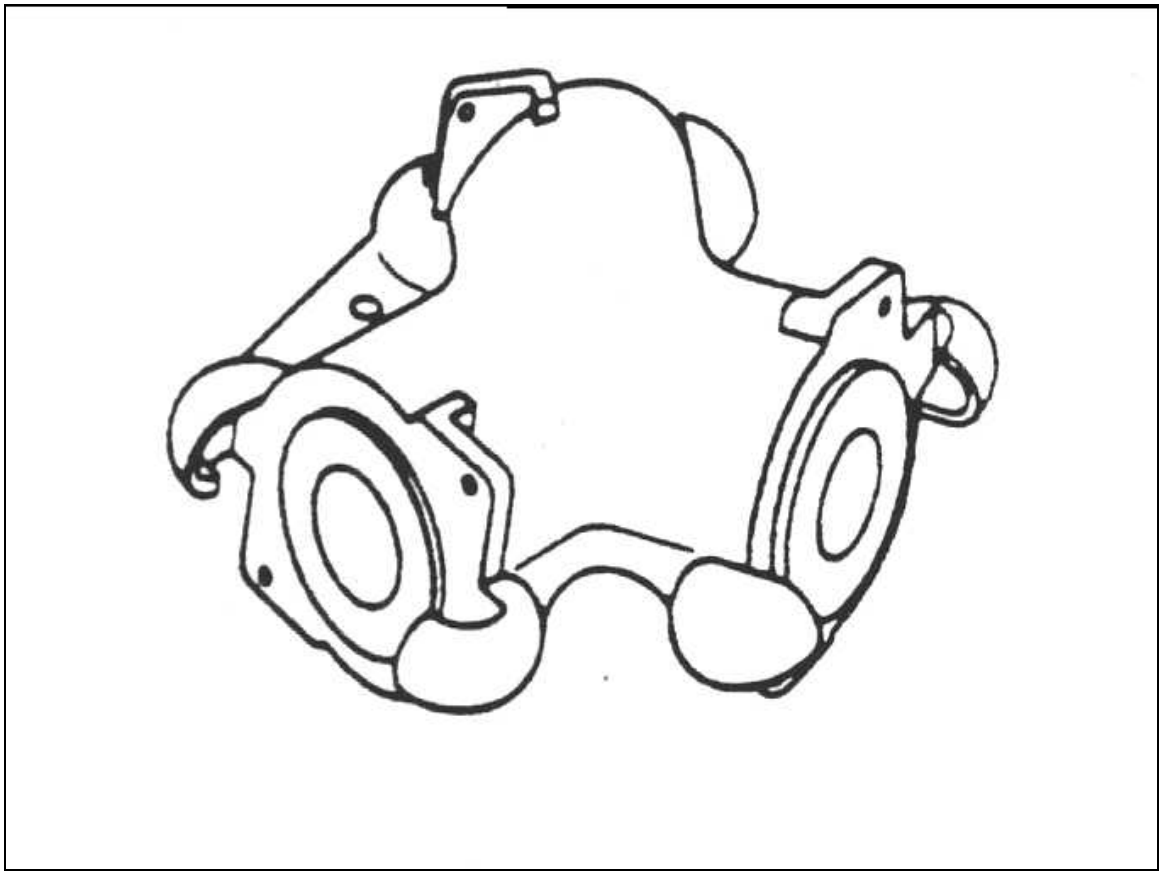
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
1		PD--Z	3990-01-505-5922	W-2-404-836-SP-SJF	Cage, Wire Folding	1	EA	LP

SECTION 2 – REPAIR PARTS LISTS
Hose Assembly, Rubber
Figure E-2



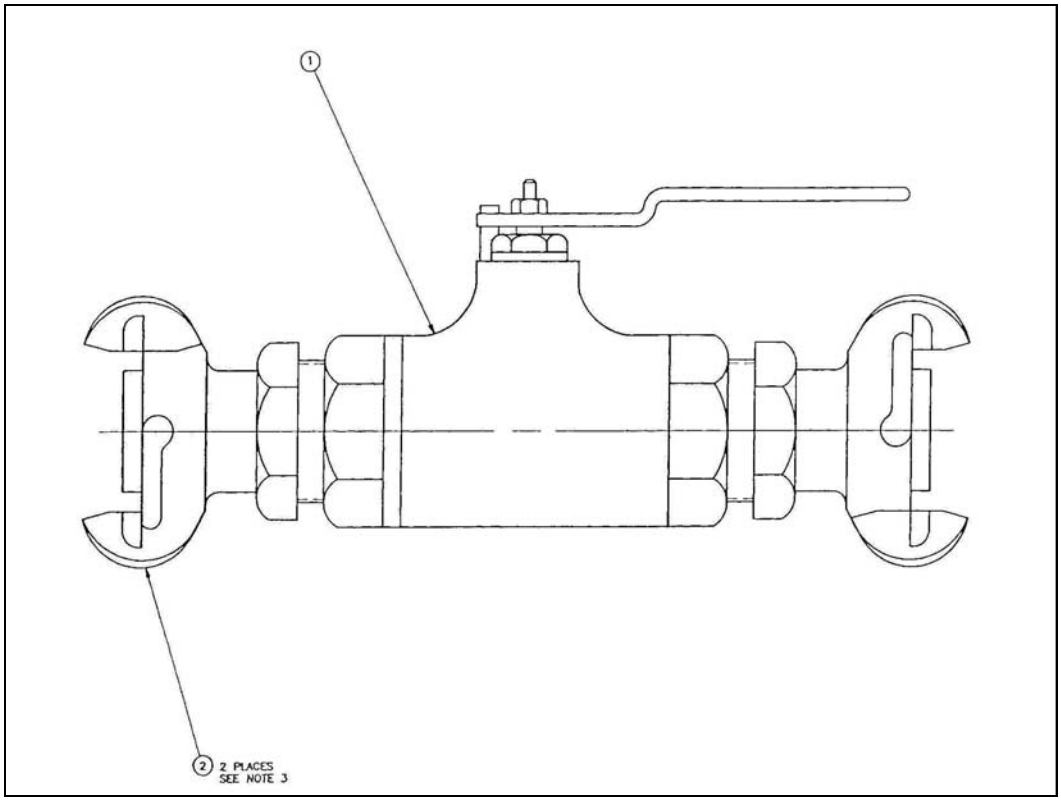
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
2		PDOOO	4720-01-434-9638	13230E5746-4	Hose Assembly Rubber, 50 ft	1	EA	S9M
2	1	PDOOO	4730-00-948-1722	MS27025-9	Coupling Half, QD	2	EA	S9C
2	2	PAO-Z	4720-00-876-8903	J-409	Clamp Hose	2	EA	S9C
2	3	XA-Z			Hose, Rubber	50	FT	LP

SECTION 2 – REPAIR PARTS LISTS
Wye, Quick Disconnect
Figure E-3



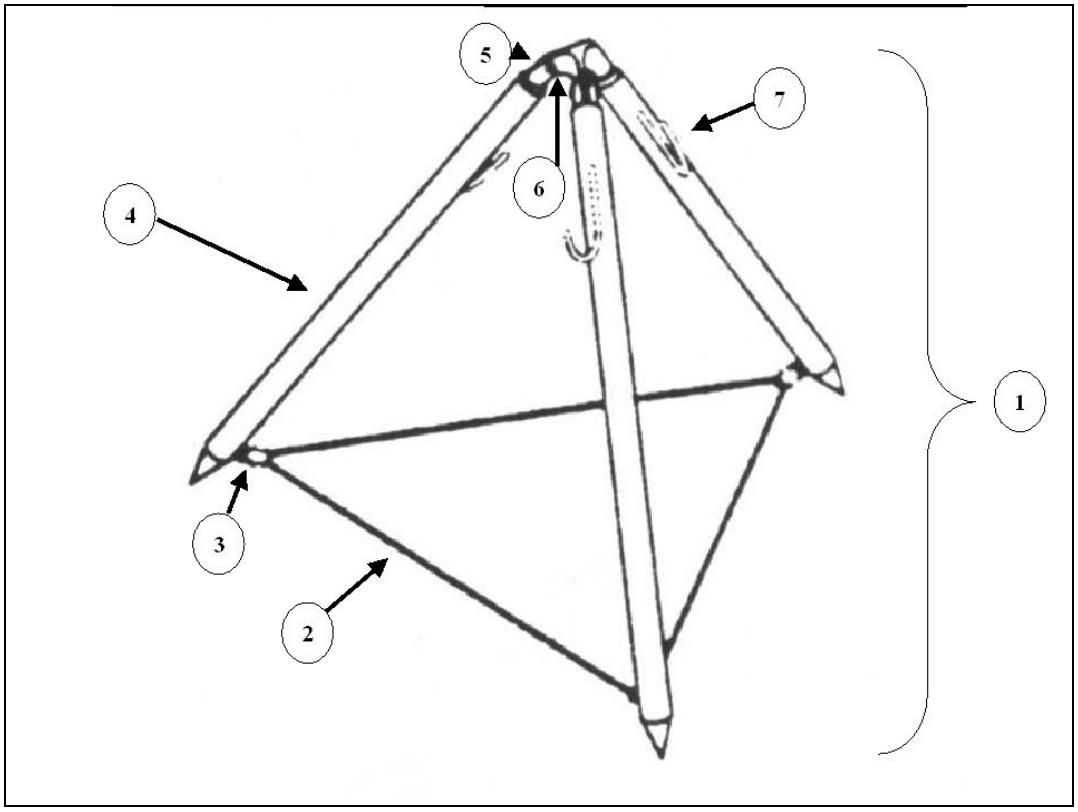
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
3		PA--Z	4730-00-496-5952	AM-10	Wye, QD	1	EA	S9C

SECTION 2 – REPAIR PARTS LISTS
Valve, Ball
Figure E-4



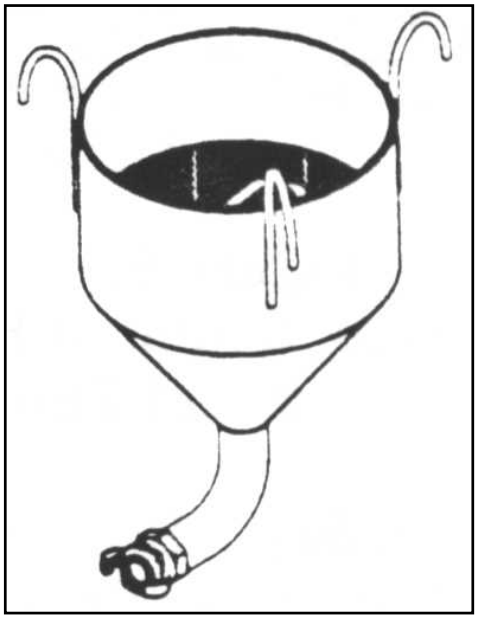
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
4		PDOOO	4820-01-440-5916	13225E7225	Valve Assembly, Ball	1	EA	S9C
4	1	PA--Z	4820-01-163-1071	WW-C-35	Valve, Ball	1	EA	S9C
4	2	PDOOO	4730-01-279-4568	WW-C-633	Coupling Half, QD	2	EA	S9C
4		PAO-Z	8030-00-889-3534	H01434M	Tape, Antiseizing	V	AR	GSA

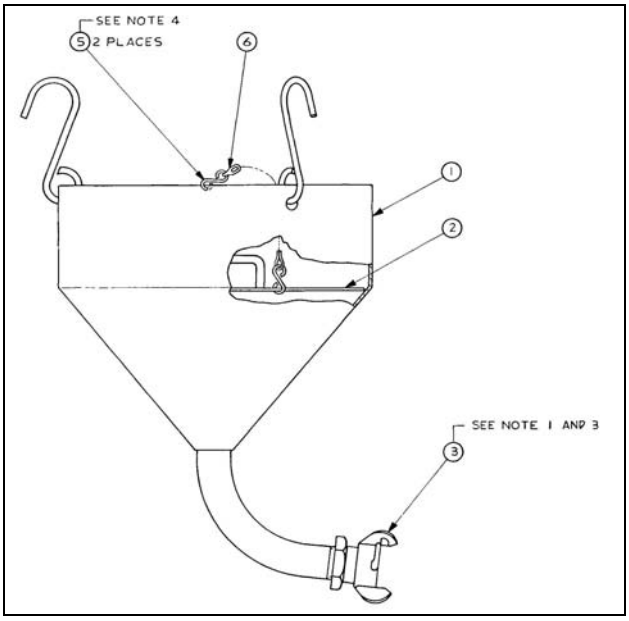
SECTION 2 – REPAIR PARTS LISTS
Stand Assembly, Distribution Nozzle
Figure E-5



(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
5		PDOOO	4930-01-120-7426	13225E9140	Stand Assembly	1	EA	S9I

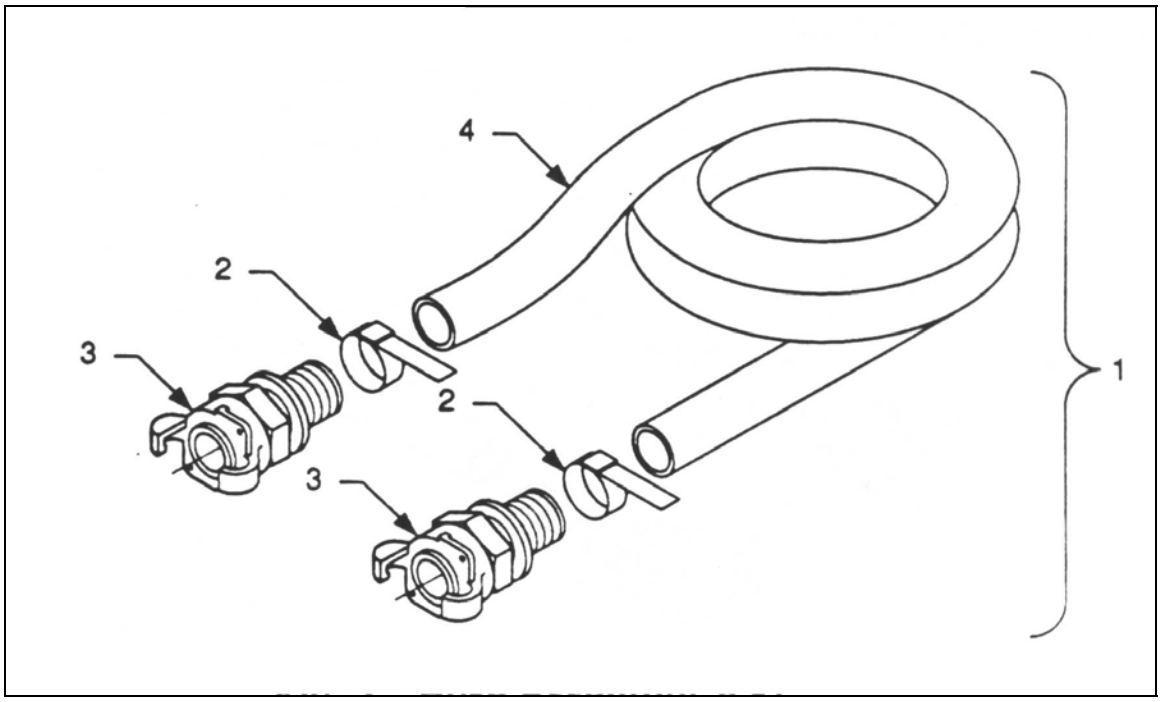
SECTION 2 – REPAIR PARTS LISTS
Funnel Assembly
Figure E-6





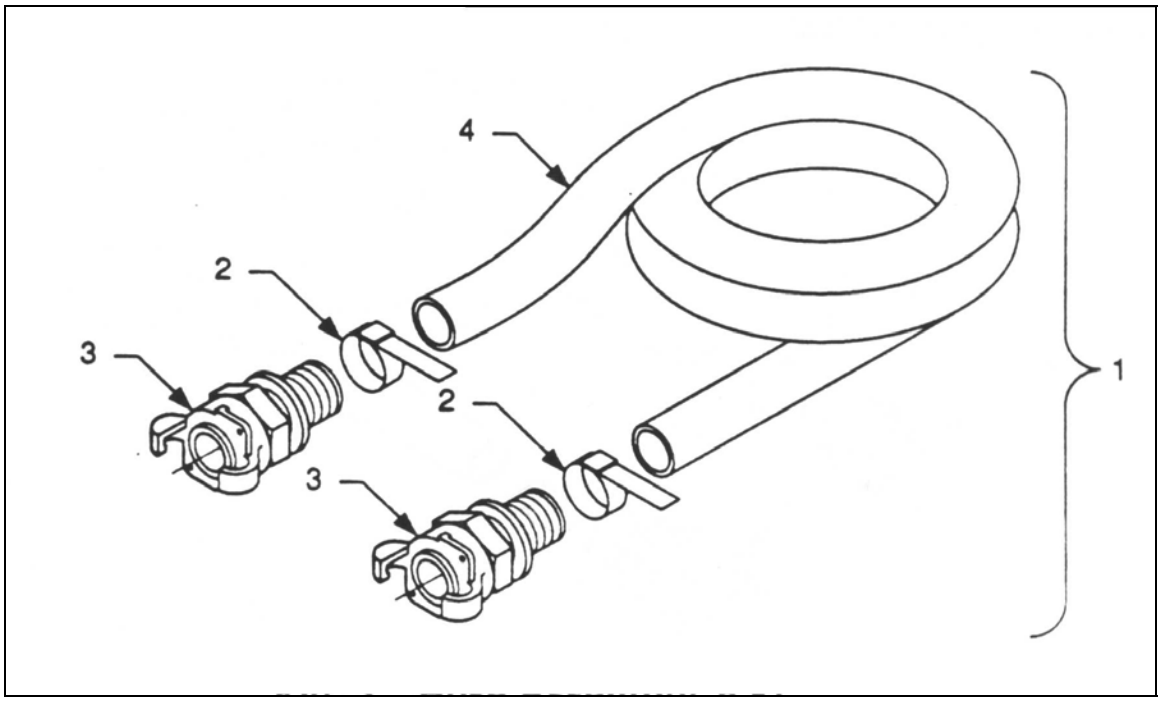
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
6		PDOOO	6545-01-434-9687	13229E7229	Funnel Assembly	1	EA	RI
6	1	PD--Z		13229E7227	Funnel	1	EA	RI
6	2	PD—Z		13229E7228	Screen, Funnel	1	EA	RI
6	3	PDOOO	4730-00-279-4568	W-W-C-633	Coupling Half, QD	1	EA	S9C
6	4	PAO-Z	8030-00-889-3534	H01434M	Tape, Antiseizing	V	AR	GSA
6	5	PAO-Z	4030-00-780-9350	MS87006-13	Hook, Chain	3	EA	S9C
6	6	PAO-Z	4010-00-228-9948	RR-C-271	Chain, Weldless	2	EA	39G

SECTION 2 – REPAIR PARTS LISTS
Hose Assembly, Rubber
1 Inch x 5 Feet
Figure F-7



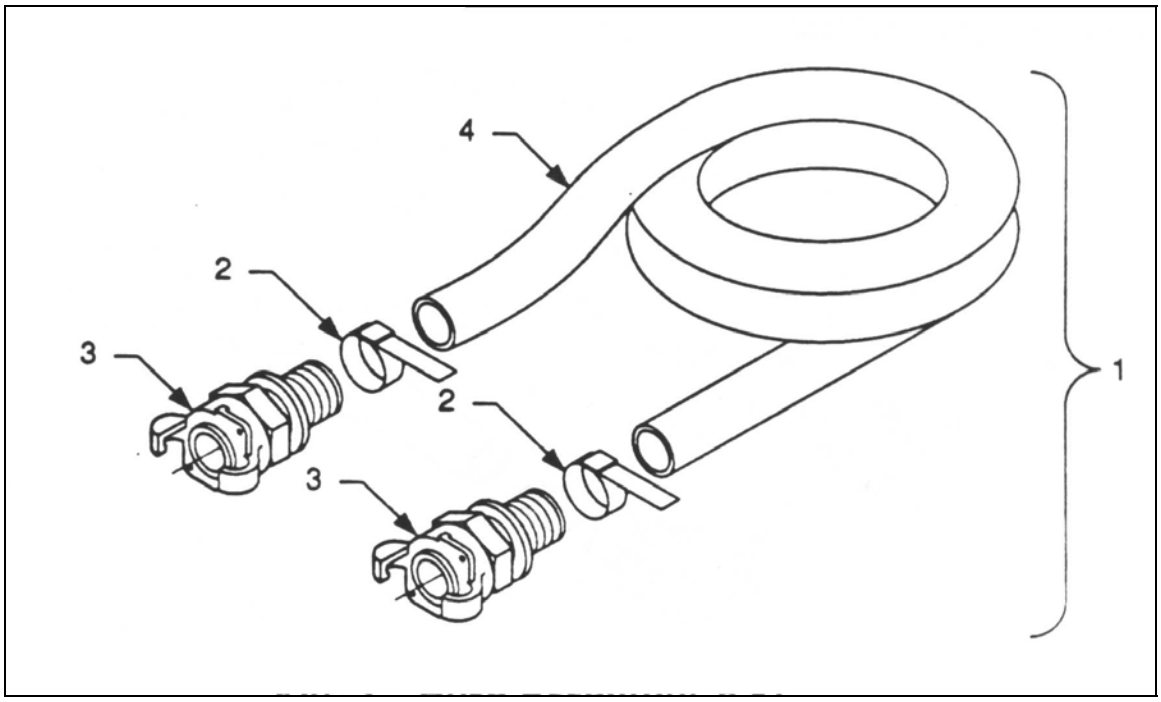
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
7	1	PDOOO	4720-01-434-9594	13229E7223-2	Hose Assembly, Rubber , 5 FT	1	EA	S9M
7	2	XA—Z	4730-00-496-5953	WWC663-05-M	Coupling Half, QD	2	EA	S9C
7	3	PAO-Z	4730-01-007-9254	J-409	Clamp, Hose	2	EA	S9C
7	4	XA-Z	4720-00-200-0367	ZZH601-3-1-16	Hose, Nonmetallic	5	FT	S9C

SECTION 2 – REPAIR PARTS LISTS
Hose Assembly, Rubber
1 Inch x 20 Feet
Figure F-8



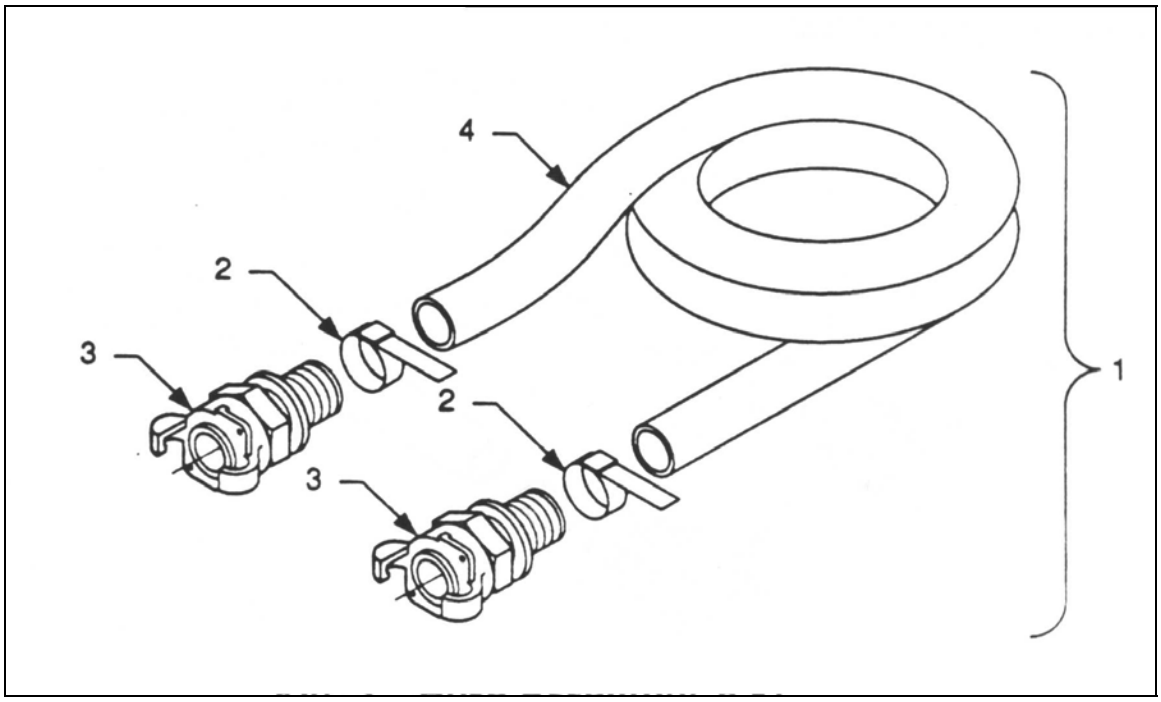
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
8	1	PDOOO	4720-01-434-9605	13229E7223-2	Hose Assembly, Rubber , 20 FT	1	EA	S9M
8	2	XA—Z	4730-00-496-5953	WWC663-05-M	Coupling Half, QD	2	EA	S9C
8	3	PAO-Z	4730-01-007-9254	J-409	Clamp, Hose	2	EA	S9C
8	4	XA-Z	4720-00-200-0367	ZZH601-3-1-16	Hose, Nonmetallic	20	FT	S9C

SECTION 2 – REPAIR PARTS LISTS
Hose Assembly, Rubber
1 Inch x 10 Feet
Figure F-9



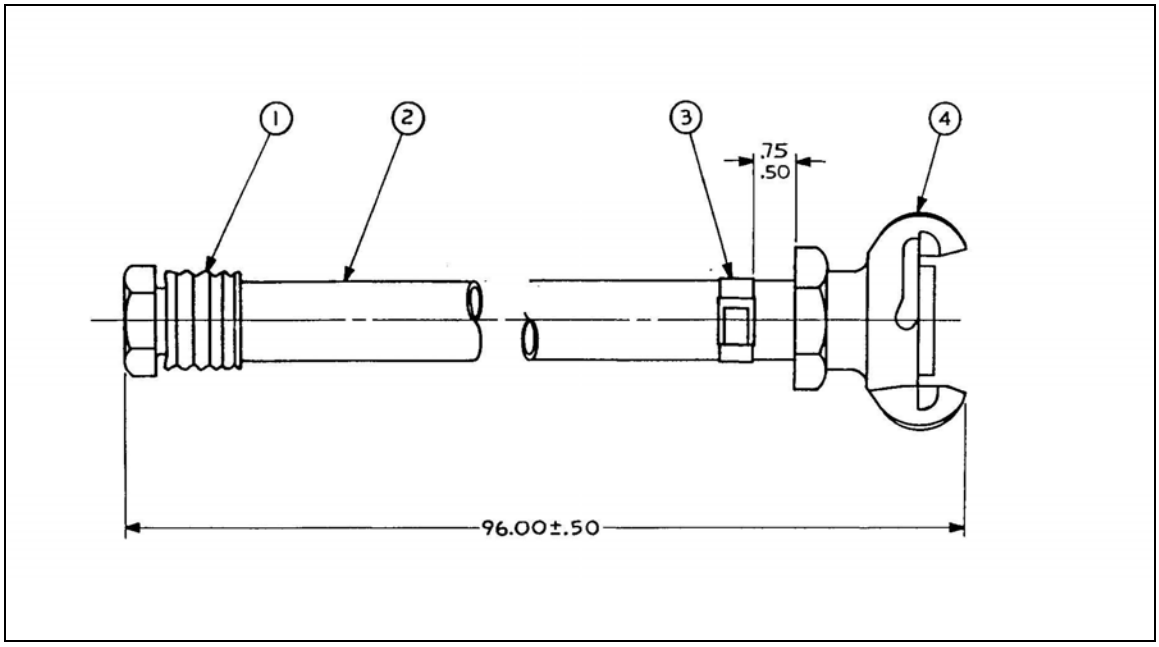
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
9	1	PDOOO	4720-01-434-9646	13229E7223-1	Hose Assembly, Rubber , 10 FT	1	EA	S9M
9	2	XA—Z	4730-00-496-5953	WWC663-05-M	Coupling Half, QD	2	EA	S9C
9	3	PAO-Z	4730-01-007-9254	J-409	Clamp, Hose	2	EA	S9C
9	4	XA-Z	4720-00-200-0367	ZZH601-3-1-16	Hose, Nonmetallic	10	FT	S9C

SECTION 2 – REPAIR PARTS LISTS
Hose Assembly, Rubber
1 Inch x 50 Feet
Figure F-10



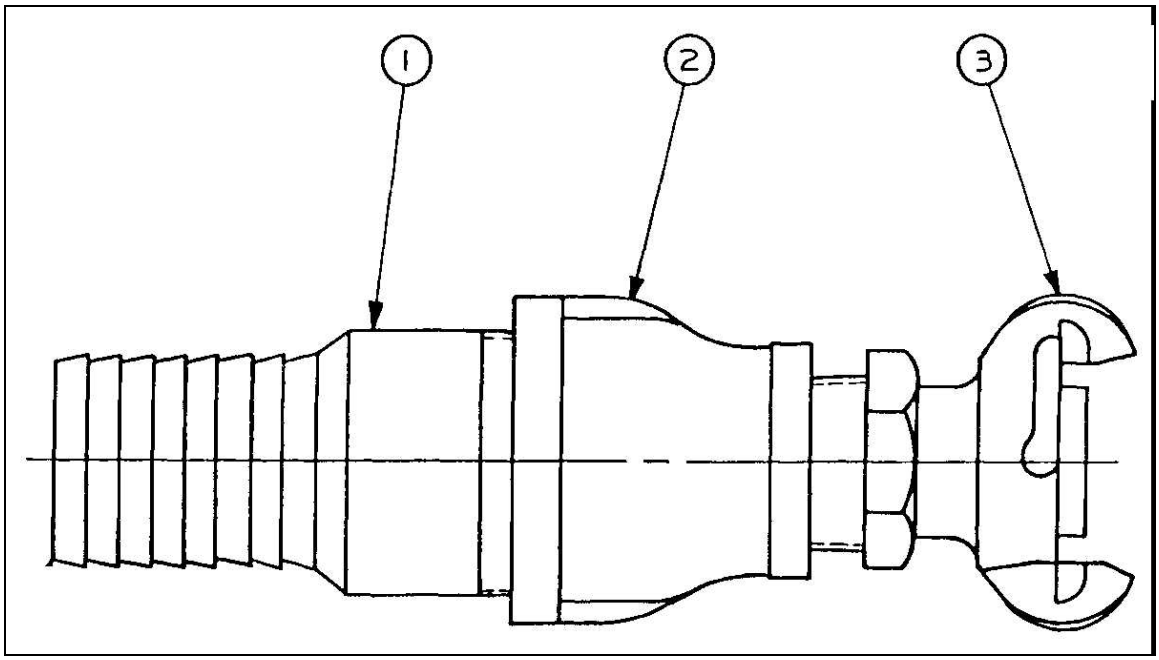
(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
10	1	PDOOO	4720-01-434-9649	13229E7223-4	Hose Assembly, Rubber , 50 FT	1	EA	S9M
10	2	XA—Z	4730-00-496-5953	WWC663-05-M	Coupling Half, QD	2	EA	S9C
10	3	PAO-Z	4730-01-007-9254	J-409	Clamp, Hose	2	EA	S9C
10	4	XA-Z	4720-00-200-0367	ZZH601-3-1-16	Hose, Nonmetallic	50	FT	S9C

SECTION 2 – REPAIR PARTS LISTS
Hose Assembly, Rubber
Figure F-11



(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
11	1	PDOOO	4720-01-434-9627	13229E7226	Hose Assembly, Rubber , 10 FT	1	EA	S9M
11	2	PAO-Z	4730-01-280-8542	NH99670410524	Clamp, Hose	2	EA	S9C
11	3	XA-Z		WWC624-2G-6-06	Coupling Assembly, Hose	1	EA	
11	4	XA-Z		WWC633-04-M	Coupling Half, QD	1	EA	
11		XA-Z		ZZH601-3-1-12-8	Hose, Nonmetallic	10	FT	

Hamilton Sink Adapter
Figure F-12



(1)								
(a) FIG NO.	(b) ITEM NO.	(2) SMR	(3) NSN	(4) PART NO.	(5) DESCRIPTION	(6) QTY	(7) UI	(8) SOS
12		PDOOO	6545-01-434-9630	13229E7224	Adapter, Sink	1	EA	S9M
12	1	PD—Z	4730-01-371-2595	BST-30	Adapter, Straight, Pipe to Hose	1	EA	S9C
12	2	PD—Z	4730-00-057-2971	ANSI B16.3	Elbow, Pipe	1	EA	S9C
12	3	PD—Z	4730-01-222-0943	WWC693-15-M	Coupling, Half, QD	1	EA	S9C
12		PAO-Z	8030-00-889-3534	H01434M	Tape, Antiseizing	V	AR	GSA

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APPENDIX F
ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE, REPAIR PARTS AND SPECIAL TOOLS LIST

PUMP UNIT, CENTRIFUGAL, 65 GPM

INTRODUCTION

F-1. Scope.

This section lists the repair parts and special tools for operation and performance of organizational, direct support, and general support maintenance of the E. C. Schleyer Pump Co. Model 4M-SE2000 electric motor driven pump.

F-2. General

This Repair Parts and Special Tools List is divided into the following sections:

a. Section II, Repair Parts List. A list of repair parts authorized for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are com-posed of functional groups in ascending numerical sequence, with the parts in each group listed in figure and item number sequence. Bulk materials are listed in NSN sequence.

b. *Section III, Special Tools List.* (Not Applicable).

c. *Section IV, National Stock Number and Part Number Index.* A list, in ascending numerical sequence, of all National Stock Numbers (NSN) appearing in the listings, followed by a list, in alphanumeric sequence, of all part numbers appearing in the listings. NSNs and part numbers (PN) are cross-referenced to each illustration figure and item number appearance. This index is followed by a cross-reference list of reference designations to figure and item number when applicable.

F-3. Explanation of Columns.

The following provides an explanation of columns in the tabular listings:

a. *Illustration.* This column is divides as follows:

(1) *Figure Number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item Number.* The number used to identify each item called out in the illustration.

b. *Source, Maintainability and Recovery Codes (SMR).*

(1) *Source Code.* Source codes are assigned to support items to indicate the manner of acquiring support items for maintenance, repair, or overhaul of end items. Source codes are entered in the first and second positions of the Uniform SMR Code format as follows:

Code	***Definition***
PA	Item procured and stocked for anticipated or known usage.
PB	Item procured and stocked for insurance purpose because essentiality dictates that a minimum quantity be available in the supply systems.
PC	Item procured and stocked and which otherwise would be coded PA except that it is deteriorative in nature.
PD	Support item, excluding support equipment, procured for initial issue or outfitting and stocked only for subsequent or additional issues or outfittings. Not subject to automatic replenishment.
PE	Support equipment procured and stocked for initial issue or outfitting to specific maintenance repair activities.
PF	Support equipment which will not be stocked but which will be centrally procured on demand.
PG	Item procured and stocked to provide for sustained support for the life of the equipment. It is applied to an item peculiar to the equipment which, because of probable discontinuance or shutdown of production facilities, would prove uneconomical to reproduce at a later time.
KD	An item of a depot overhaul/repair kit and not purchased separately. Depot kit defined as a kit that provides items required at the time of overhaul of repair.
KF	An item of a maintenance kit and not purchased separately. Maintenance kit defined as a kit that provided an item that can be replaced at organizational or intermediate levels of maintenance.
KB	Item included in both a depot overhaul/repair kit and a maintenance kit.

MO Item to be manufactured or fabricated at organizational level.

MF Item to be manufactured or fabricated at direct support level.

MH Item to be manufactured or fabricated at general support level.

MD Item to be manufactured or fabricated at depot maintenance level.

AO Item to be assembled at organizational level.

AF Item to be assembled at direct support maintenance level.

AH Item to be assembled at general support maintenance level.

AD Item to be assembled at depot maintenance level.

XA Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly.

XB Item is not procured or stocked. If not available through salvage, requisition.

XD A support item that is not stocked. When required item will be procured through normal supply channels.

NOTE

Cannibalization or salvage may be used as a source of supply for any items coded above except for those coded XA, XD, and aircraft support items as restricted by AR 700-42.

(2) Maintenance Code.

Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code format as follows:

(a) The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace, and use the support item. The maintenance code entered in the third position will indicate one of the following levels of maintenance:

Code ***Application/Explanation***

C Crew or operator maintenance performed within organizational maintenance.

Code ***Application/Explanation***

O Support item is removed, replaced, used at the organizational level.

I Support item is removed, replaced, used by the direct support element of integrated direct support maintenance.

F Support item s removed, replaced, used at the direct support level.

H Support item s removed, replaced, used at the general support level.

D Support item s removed, replaced, used at the depot, mobile depot, specialized repair activity only.

NOTE

Codes "I" and "F" will be considered the same by direct support units.

(b) The maintenance code entered in the fourth position indicates whether the item is to be repaired and identified the lowest maintenance level with the capability to perform repair (i.e., all authorized maintenance functions). This position will contain one of the following maintenance codes:

Code ***Application/Explanation***

O The lowest maintenance level capable of complete repair of support item is the organizational level.

F The lowest maintenance level capable of complete repair of support item is the direct support level.

H The lowest maintenance level capable of complete repair of support item is the general support level.

D The lowest maintenance level capable of complete repair of support item is the depot level, mobile depot or specialized repair activity.

Z Non-repairable. No repair is authorized.

B No repair is authorized. The item may be reconditioned by adjusting, lubricating, etc., at the user level. No parts or special tools are procured for maintenance of this item.

(3) Recoverability Code.
Recoverability codes are assigned to support items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the Uniform SMR Code format as follows:

Recoverability Codes	***Definitiion***
Z	Non-Repairable item. When unserviceable, condemn and dispose at the level indicated in position 3.
O	Repairable item. When uneconomically repairable, condemn and dispose at organizational level.
F	Repairable item. When uneconomically repairable, condemn and dispose at the direct support level.
H	Repairable item. When uneconomically repairable, condemn and dispose at the general support level.
D	Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L	Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot/special repair activity level.
A	Item requires special handling or condemnation procedures because of specific reasons (i.e., precious metal content, high dollar value, critical material or hazardous material). Refer to appropriate manuals/ directives for specific instructions.

c. *National Stock Number.*
Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

d. *Part Number.* Indicates the primary part number used by the manufacturer which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements, to identify an item or range of items.

NOTE

When a stock numbered item is requisitioned, the repair part received may have a different part number than the part being replaced.

e. *Federal Supply Code for Manufacturer (FSCM).* The FSCM is a 5-digit numeric code listed in SB 708-42 which is used to identify the manufacturer, distributor, or Government agency, etc.

f. *Description.* Indicates the Federal item name and, if required, a minimum description to identify the item.

g. *Unit of Measure (U/M).* Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measurement is expressed by a two-character alphabetical abbreviation (e.g., ea. in. pr. Etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

h. *Quantity Incorporated in Unit.* Indicates the quantity of the item used in the breakdown shown on the illustration figure which is prepared for a functional group, subfunctional group, or an assembly. A “V” appearing in this column in lieu of a quantity indicates that no specific quantity is applicable, (e.g., shims, spacers, etc.).

F-4. How to Locate Repair Parts.

a. *When National Stock Number or Part Number is Unknown.*

(1) *First.* Using the table of contents, determine the functional group within which the repair part belong. This necessary since illustrations are prepared for functional groups and listing are divided into the same groups.

(2) *Second.* Find the illustration covering the functional group to which the repair part belongs.

(3) *Third.* Identify the repair part on the illustration figure and item number of the repair part.

(4) *Fourth.* Using the Repair Parts Listing, find the figure and item number noted on the illustration.

b. *When National Stock Number or Part Number is Known.*

(1) *First.* Using the Index of National Stock Numbers and Part Numbers, find the pertinent National Stock Number or part number. This index is in ascending NSN sequence followed by a list of part numbers in ascending alphanumeric sequence, cross-references to the illustration figure number and item number.

(2) *Second.* After finding the figure and item number, locate the figure and item number in the repair parts list.

F-5. Abbreviations.

Abbreviations	*Explanation*
mtg	mounting

(1)		(2)	(3)	(4)	(5)	(6)
Illustration						
(a)	(b)					
Figure	Item	SMR				
No.	No.	Code	NSN	Part Number	FSCM	Nomenclature
						SECTION 01 REPAIR PARTS LIST
						Group 31 - FRAME ASSEMBLY
F.1	1	PAOZZ	5305-00-068-0502	MS90725-64	96906	Screw, Cap, Hexagon Head
F.1	2	PAOZZ	5310-00-582-5965	MS35338-44	96906	Washer, Lock
F.1	3	PAOZZ	5310-00-761-6882	MS51967-2	96906	Nut, Plain, Hexagon
F.1	4	PAOZZ	5305-00-993-2461	MS35207-281	96906	Screw, Machine
F.1	5	PAOZZ	5310-00-903-8282	MS20364-428	96906	Nut, Self Locking, Hexagon
F.1	6	PAOZZ	5940-00-114-1317	MS20659-109	96906	Terminal, Lug
F.1	7	PAOZZ	5305-00-989-7435	MS35207-264	96906	Screw, Machine
F.1	8	PAOZZ	5310-00-902-6676	MS21083N3	96906	Nut, Self Locking, Hexagon
F.1	9	PAOZZ	5940-00-143-4794	MS25036-112	96906	Terminal, Lug
F.1	10	PAOZZ	5305-00-725-2317	MS90725-64	96906	Screw, Cap, Hexagon Head
F.1	11	PAOZZ	5310-00-732-0558	MS51967-8	96906	Nut, Plain, Hexagon
F.1	12	PAOZZ	5310-00-637-9541	MS35338-46	96906	Washer, Lock
F.1	13	PBOFE		13200E7218	97403	FR PUMP WELDMENT
						GROUP 02 ASSESSORY ITEMS
F.2	1	PAOZZ	6150-00-971-2116	1300E7222	97403	Cable Assembly, Power Electrical
F.2	2	PAOZZ	5305-00-253-5625	MS21318-46	96906	Screw, Drive
F.2	3	PAOZZ		6673407	78099	Plate, Data
F.2	4	PAOZZ		13219E2404	97403	Plate, Data
						GROUP 03 ELECTRIC MOTOR ASSEMBLY
F.3		PAOZZ	6150-00-971-2116	13200E7222	97403	Cable Assembly, Power Electric
F.3	1	PAOZZ	5305-00-855-0961	MS24629-35	96906	Screw, Tapping
F.3	2	PAOZZ		06-40	05472	Lid Box
F.3	3	PAOZZ		06-49	05472	Gasket Box Lid
F.3	4	PAOZZ	5305-00-206-2508	MS35215-53	96906	Screw, Machine
F.3	5	PAOZZ	5975-00-281-0049	7546075	19204	Box, Connector, Electrical
F.3	6	PAOZZ		A678760		Screw, Box
F.3	7	PAOZZ		36-2131		Box Connector
F.3	8	PAOZZ	5320-01-065-8851	36-48	05472	Gasket, Box
F.3	9	PAOZZ	5305-00-723-0385	02781	05748	Set Screw
F.3	10	PAOZZ		36-696	05472	Cover, Fan
F.3	11	PAOZZ	5305-00-723-9385	MS51963-65	96909	Set Screw
F.3	12	PAOZZ	4140-01-087-0359	32-134	05472	Fan, External
F.3	13	PAOZZ	5310-00-723-4458	MS35609-404	96906	Nut, Plain, Hexagon
F.3	14	PAOZZ		36-696	05472	Cover, Fan
F.3	15	PAPZZ		36-1120	05472	Endplate Pulley
F.3	16	PAPZZ		52WES	05472	Washer Retainer, Special
F.3	17	PAOZZ	5305-00-995-3441	MS35207-269	96906	Screw, Machine
F.3	18	PAOZZ	5310-00-045-3296	MS35338-43	96906	Washer, Lock
F.3	19	XBPZZ		36-694	05472	Endplate, Front

(1)		(2)	(3)	(4)	(5)	(6)
Illustration						
(a)	(b)					
Figure	Item	SMR				
No.	No.	Code	NSN	Part Number	FSCM	Nomenclature
						GROUP 03 ELECTRIC MOTOR ASSEMBLY
						(CONTINUED)
F.3	20	PAOZZ	5315-00-043-1787	MS35756-34	96906	Key, Woodruff
F.3	21	PAOZZ		6-31	05472	Sleeve, Shaft
F.3	22	PAOZZ	3110-00-109-1157	1169377	19204	Bearing, Ball, Annular
F.3	23	ABFZZ		6-417	05472	Retainer
F.3	24	ABFZZ		38-1008	05472	Fan, Internal
F.3	25	ABFZZ		36-3998	05472	Shaft
F.3	26	ABFZZ	6105-00-717-1361	36-271	05472	Motor, Electric
F.3	27	ABFZZ	6105-00-717-1283	36-2118	05472	Plate, Data
F.3		PAOZZ	6105-00-793-6752	62530	92940	Motor, Alternating Current
						GROUP 34 PUMP ASSEMBLY
F.4	1	PBFZZ	5306-00-686-5722	13200E7212	97403	Bolt, Shoulder
F.4	2	ABFZZ	5340-00-991-6492	13200E7203	97403	Cover, Access
F.4	3	PBFZZ	5330-00-527-8116	MS29512-252	96906	O-Ring
F.4	4	PBFZZ	5306-00-225-9093	MS90725-38	96906	Screw, Cap, Hexagon Head
F.4	5	PBFZZ	5310-00-407-9566	MS35338-45	96906	Washer, Lock
F.4	6	PBFZZ	5310-01-077-3906	13214E9380-5	97403	Washer, Flat
F.4	7	PBFZZ	4320-00-784-6797	13200E7204	97403	Impeller, Pump, Centrifugal
F.4	8	PBFZZ	5305-00-957-6652	MS35198-67	96906	Screw, Machine
F.4	9	PBFZZ	4320-00-790-6398	13200E7214	97403	Plate, Wear, Rotary Pump
F.4	10	PBFZZ	5310-00-133-4598	NAS1515H4	80205	Washer, Flat
F.4	11	PBFZZ	5315-00-989-2342	MS20066-183	96906	Key, Machine
F.4	12	PBFZZ	4320-00-784-6799	13200E7205	97403	Coupling, Shaft, Rigid
F.4	13	PBFZZ	4320-00-790-6357	13200E8806	97403	Seal Assembly, Pump
F.4	14	PBFZZ	5305-00-054-9261	MS51955-6	96906	Setscrew
F.4	15	PBFZZ	5310-00-851-2674	MS35691-1	96906	Nut, Plain, Hexagon
F.4	16	PBFZZ	5310-00-133-4598	NAS1515H4	80205	Washer, Flat
F.4	17	PBFZZ	5330-00-298-4139	33074	20266	Gasket
F.4	18	PBFZZ	4730-00-277-5636	WWP512	81348	Elbow, Pipe
F.4	19	PBFZZ	4730-00-277-8891	MS15953-172B	96906	Nipple, Pipe
F.4	20	PBFZZ	5340-00-991-6495	13200E7213	97403	Diverter, Pump
F.4	21	ABOZZ		47CL5	20266	Adapter
F.4	22	PAOZZ	5310-00-880-7746	MS51968-5	96906	Nut, Plain, Hexagon
F.4	23	PAOZZ	4320-00-103-8199	13200E7224	97403	Flange, Pipe
F.4	24	PAOZZ	4730-00-247-6414	13200E7225	97403	Adapter Straight, Flange to Pipe
F.4	25	PAOZZ	5305-00-637-1119	MS35214-69	96906	Screw, Machine
F.4	26	PAOZZ		13200E7228	97403	Weight, Check Valve
F.4	27	PAOZZ		13200E7227	97403	Weight, Check Valve
F.4	28	PAOZZ	5330-00-980-0123	13200E7226	97403	Gasket, Check Valve
F.4	29	PAOZZ	4820-00-174-0329	MS35782-3	96906	Cock, Drain
F.4	30	PAOZZ	5307-01-078-2425	NAS183-5-13A	80205	Stud, Plain
F.4	31	PAOZZ	4730-00-555-1355	MS20913-6CR	96906	Plug, Pipe
F.4	32	8HZZ	5310-00-717-1380	13200E7202	97403	Housing, Liquid Pump

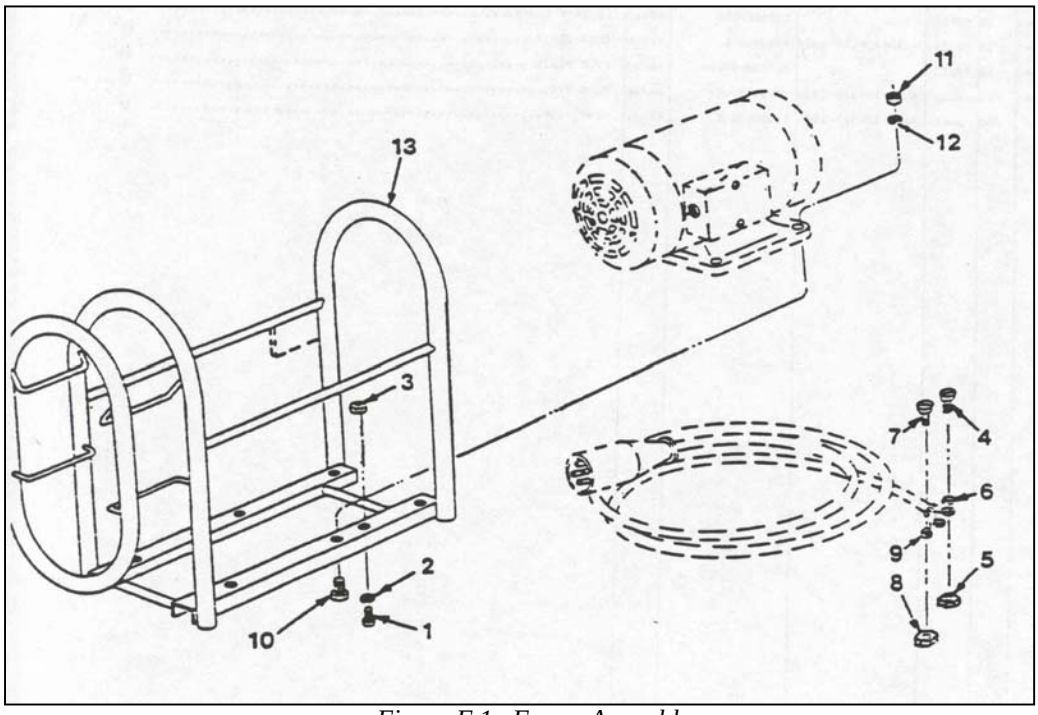


Figure F.1. Frame Assembly

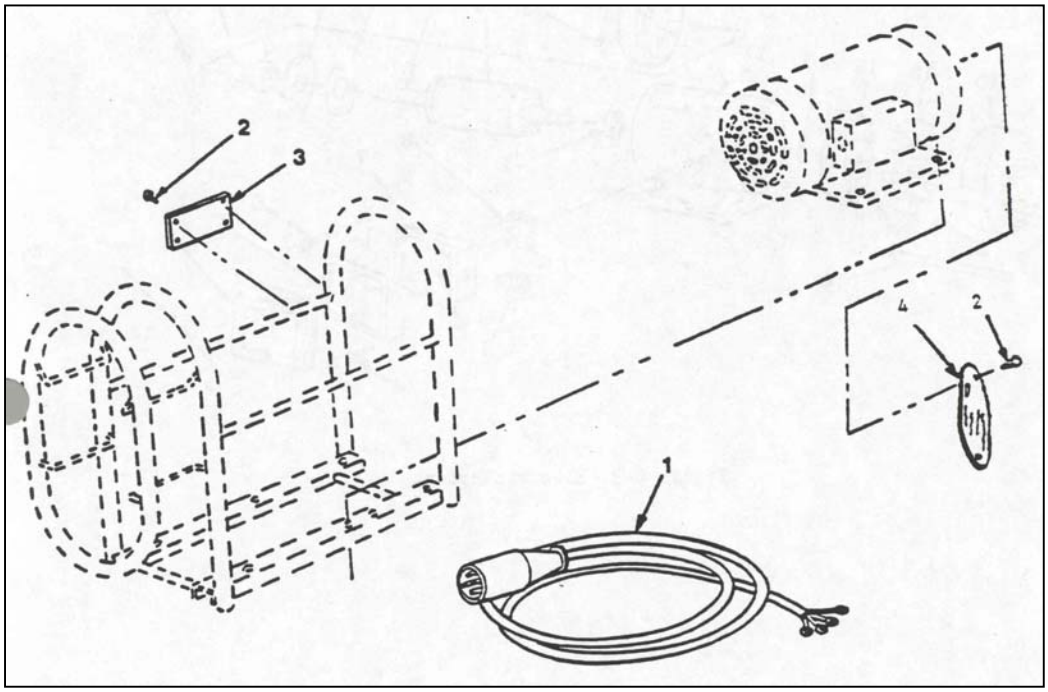


Figure F.2. Accessory Items

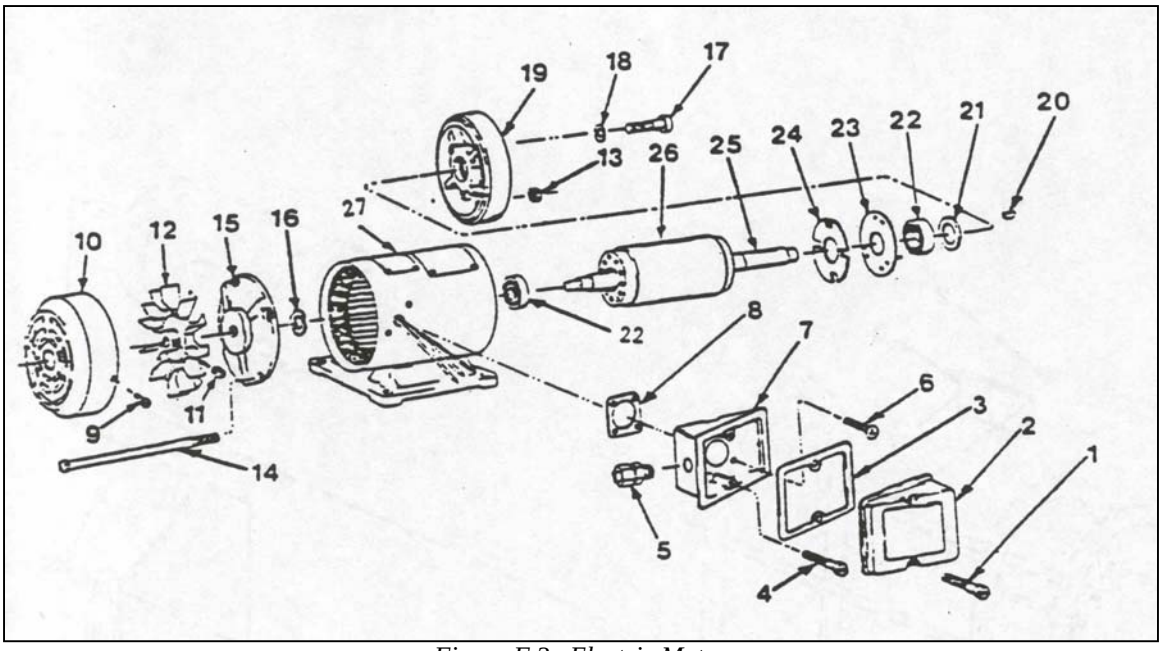


Figure F.3. Electric Motor

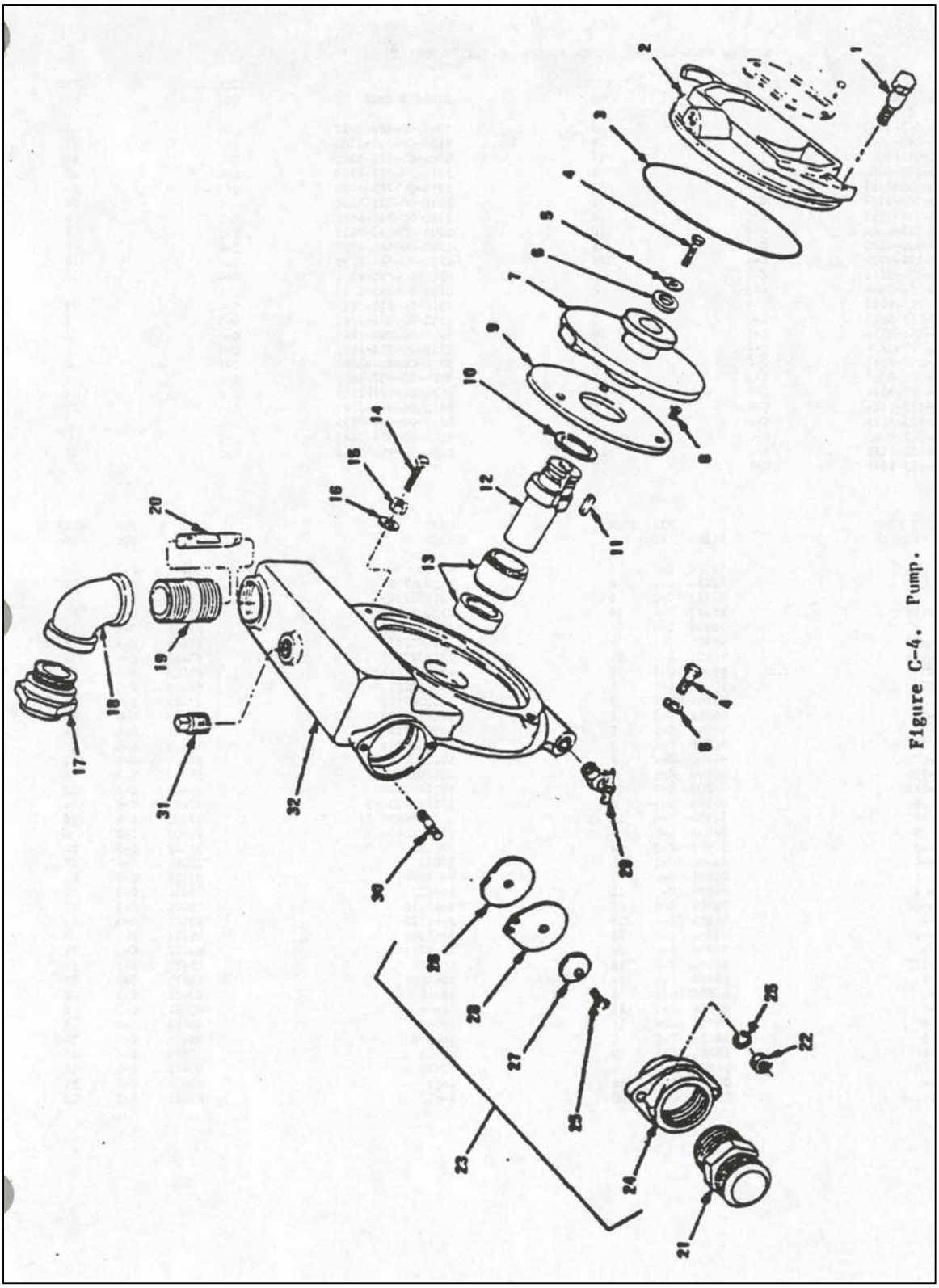


Figure F-4. Pump

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NSN	Part Number	FSCM	Nomenclature	Figure No.	Item No.
5315-00-043-1787	MS35756-34	96906	Key, Woodruff	F.3	20
5310-00-045-3296	MS35338-43	96906	Washer, Lock	F.3	18
5305-00-054-9261	MS51955-6	96906	Setscrew	F.4	14
5305-00-068-0502	MS90725-64	96906	Screw, Cap, Hexagon Head	F.1	1
4320-00-103-8199	13200E7224	97403	Flange, Pipe	F.4	23
3110-00-109-1157	1169377	19204	Bearing, Ball, Annular	F.3	22
5940-00-114-1317	MS20659-109	96906	Terminal, Lug	F.1	6
5310-00-133-4598	NAS1515H4	80205	Washer, Flat	F.4	10
5310-00-133-4598	NAS1515H4	80205	Washer, Flat	F.4	16
5940-00-143-4794	MS25036-112	96906	Terminal, Lug	F.1	9
4820-00-174-0329	MS35782-3	96906	Cock, Drain	F.4	29
5305-00-206-2508	MS35215-53	96906	Screw, Machine	F.3	4
5306-00-225-9093	MS90725-38	96906	Screw, Cap, Hexagon Head	F.4	4
4730-00-247-6414	13200E7225	97403	Adapter Straight, Flange to Pipe	F.4	24
5305-00-253-5625	MS21318-46	96906	Screw, Drive	F.2	2
4730-00-277-5636	WWP512	81348	Elbow, Pipe	F.4	18
4730-00-277-8891	MS15953-172B	96906	Nipple, Pipe	F.4	19
5975-00-281-0049	7546075	19204	Box, Connector, Electrical	F.3	5
5330-00-298-4139	33074	20266	Gasket	F.4	17
5310-00-407-9566	MS35338-45	96906	Washer, Lock	F.4	5
5330-00-527-8116	MS29512-252	96906	O-Ring	F.4	3
4730-00-555-1355	MS20913-6CR	96906	Plug, Pipe	F.4	31
5310-00-582-5965	MS35338-44	96906	Washer, Lock	F.1	2
5305-00-637-1119	MS35214-69	96906	Screw, Machine	F.4	25
5310-00-637-9541	MS35338-46	96906	Washer, Lock	F.1	19
5306-00-686-5722	13200E7212	97403	Bolt, Shoulder	F.4	1
6105-00-717-1283	36-2118	05472	Plate, Data	F.3	27
6105-00-717-1361	36-271	05472	Motor, Electric	F.3	26
5310-00-717-1380	13200E7202	97403	Housing, Liquid Pump	F.4	32
5310-00-723-4458	MS35609-404	96906	Nut, Plain, Hexagon	F.3	13
5305-00-723-0385	02781	05748	Set Screw	F.3	9
5305-00-725-2317	MS90725-64	96906	Screw, Cap, Hexagon Head	F.1	10
5310-00-732-0558	MS51967-8	96906	Nut, Plain, Hexagon	F.1	11
5310-00-761-6882	MS51967-2	96906	Nut, Plain, Hexagon	F.1	3
4320-00-784-6797	13200E7204	97403	Impeller, Pump, Centrifugal	F.4	7
4320-00-784-6799	13200E7205	97403	Coupling, Shaft, Rigid	F.4	12
4320-00-790-6357	13200E8806	97403	Seal Assembly, Pump	F.4	13
4320-00-790-6398	13200E7214	97403	Plate, Wear, Rotary Pump	F.4	9
6105-00-793-6752	62530	92940	Motor, Alternating Current	F.3	
5310-00-851-2674	MS35691-1	96906	Nut, Plain, Hexagon	F.4	15
5305-00-855-0961	MS24629-35	96906	Screw, Tapping	F.3	1
5310-00-880-7746	MS51968-5	96906	Nut, Plain, Hexagon	F.4	22
5310-00-902-6676	MS21083N3	96906	Nut, Self Locking, Hexagon	F.1	8
5310-00-903-8282	MS20364-428	96906	Nut, Self Locking, Hexagon	F.1	5

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NSN	Part Number	FSCM	Nomenclature	Figure No.	Item No.
5305-00-957-6652	MS35198-67	96906	Screw, Machine	F.4	8
6150-00-971-2116	1300E7222	97403	Cable Assembly, Power Electrical	F.2	1
5330-00-980-0123	13200E7226	97403	Gasket	F.4	28
5315-00-989-2342	MS20066-183	96906	Key, Machine	F.4	11
5305-00-989-7435	MS35207-264	96906	Screw, Machine	F.1	7
5305-00-993-2461	MS35207-281	96906	Screw, Machine	F.1	4
5305-00-995-3441	MS35207-269	96906	Screw, Machine	F.3	17
5340-00-991-6492	13200E7203	97403	Cover, Access	F.4	2
5340-00-991-6495	13200E7213	97403	Diverter, Pump	F.4	20
5310-01-077-3906	13214E9380-5	97403	Washer, Flat	F.4	6
5307-01-078-2425	NAS183-5-13A	80205	Stud, Plain	F.4	30
	13200E7227	97403		F.4	27
	13200E7228	97403		F.4	26
	13219E2404	97403	Plate, Data	F.2	4
	205522	38442		F.4	22

PART NUMBER AND NATIONAL STOCK NUMBER INDEX

Part Number	FSCM	NSN	Nomenclature	Figure No.	Item No.
33074	20266	5330-00-298-4139	Gasket	F.4	17
62530	92940	6105-00-793-6752	Motor, Alternating Current	F.3	
205522	38442			F.4	22
1169377	19204	3110-00-109-1157	Bearing, Ball, Annular	F.3	22
7546075	19204	5975-00-281-0049	Box, Connector, Electrical	F.3	5
02781	05748	5305-00-723-0385	Set Screw	F.3	9
1300E7222	97403	6150-00-971-2116	Cable Assembly, Power Electrical	F.2	1
13200E7202	97403	5310-00-717-1380	Housing, Liquid Pump	F.4	32
13200E7203	97403	5340-00-991-6492	Cover, Access	F.4	2
13200E7204	97403	4320-00-784-6797	Impeller, Pump, Centrifugal	F.4	7
13200E7205	97403	4320-00-784-6799	Coupling, Shaft, Rigid	F.4	12
13200E7212	97403	5306-00-686-5722	Bolt, Shoulder	F.4	1
13200E7213	97403	5340-00-991-6495	Diverter, Pump	F.4	20
13200E7214	97403	4320-00-790-6398	Plate, Wear, Rotary Pump	F.4	9
13200E7224	97403	4320-00-103-8199	Flange, Pipe	F.4	23
13200E7225	97403	4730-00-247-6414	Adapter Straight, Flange to Pipe	F.4	24
13200E7226	97403	5330-00-980-0123	Gasket	F.4	28
13200E7227	97403			F.4	27
13200E7228	97403			F.4	26
13200E8806	97403	4320-00-790-6357	Seal Assembly, Pump	F.4	13
13214E9380-5	97403	5310-01-077-3906	Washer, Flat	F.4	6
13219E2404	97403		Plate, Data	F.2	4
36-2118	05472	6105-00-717-1283	Plate, Data	F.3	27
36-271	05472	6105-00-717-1361	Motor, Electric	F.3	26
MS15953-172B	96906	4730-00-277-8891	Nipple, Pipe	F.4	19
MS20066-183	96906	5315-00-989-2342	Key, Machine	F.4	11
MS20364-428	96906	5310-00-903-8282	Nut, Self Locking, Hexagon	F.1	5
MS20659-109	96906	5940-00-114-1317	Terminal, Lug	F.1	6
MS20913-6CR	96906	4730-00-555-1355	Plug, Pipe	F.4	31
MS21083N3	96906	5310-00-902-6676	Nut, Self Locking, Hexagon	F.1	8
MS21318-46	96906	5305-00-253-5625	Screw, Drive	F.2	2
MS24629-35	96906	5305-00-855-0961	Screw, Tapping	F.3	1
MS25036-112	96906	5940-00-143-4794	Terminal, Lug	F.1	9
MS29512-252	96906	5330-00-527-8116	O-Ring	F.4	3
MS35198-67	96906	5305-00-957-6652	Screw, Machine	F.4	8
MS35207-264	96906	5305-00-989-7435	Screw, Machine	F.1	7
MS35207-269	96906	5305-00-995-3441	Screw, Machine	F.3	17
MS35207-281	96906	5305-00-993-2461	Screw, Machine	F.1	4
MS35214-69	96906	5305-00-637-1119	Screw, Machine	F.4	25
MS35215-53	96906	5305-00-206-2508	Screw, Machine	F.3	4
MS35338-43	96906	5310-00-045-3296	Washer, Lock	F.3	18
MS35338-44	96906	5310-00-582-5965	Washer, Lock	F.1	2
MS35338-45	96906	5310-00-407-9566	Washer, Lock	F.4	5
MS35338-46	96906	5310-00-637-9541	Washer, Lock	F.1	19
MS35609-404	96906	5310-00-723-4458	Nut, Plain, Hexagon	F.3	13

PART NUMBER AND NATIONAL STOCK NUMBER INDEX

Part Number	FSCM	NSN	Nomenclature	Figure No.	Item No.
MS35691-1	96906	5310-00-851-2674	Nut, Plain, Hexagon	F.4	15
MS35756-34	96906	5315-00-043-1787	Key, Woodruff	F.3	20
MS35782-3	96906	4820-00-174-0329	Cock, Drain	F.4	29
MS51955-6	96906	5305-00-054-9261	Setscrew	F.4	14
MS51967-2	96906	5310-00-761-6882	Nut, Plain, Hexagon	F.1	3
MS51967-8	96906	5310-00-732-0558	Nut, Plain, Hexagon	F.1	11
MS51968-5	96906	5310-00-880-7746	Nut, Plain, Hexagon	F.4	22
MS90725-38	96906	5306-00-225-9093	Screw, Cap, Hexagon Head	F.4	4
MS90725-64	96906	5305-00-068-0502	Screw, Cap, Hexagon Head	F.1	1
MS90725-64	96906	5305-00-725-2317	Screw, Cap, Hexagon Head	F.1	10
NAS1515H4	80205	5310-00-133-4598	Washer, Flat	F.4	10
NAS1515H4	80205	5310-00-133-4598	Washer, Flat	F.4	16
NAS183-5-13A	80205	5307-01-078-2425	Stud, Plain	F.4	30
WWP512	81348	4730-00-277-5636	Elbow, Pipe	F.4	18

APPENDIX G
ORGANIZATIONAL MAINTENANCE
REPAIR PARTS AND COMPONENTS
PUMP, CENTRIFUGAL: FRAME MOUNTED, 1½-INCH
ELECTRIC MOTOR DRIVEN
Modified Grainger Model 4XZ11 Pump
NSN: 4320-01-506-4459

SECTION 1. INTRODUCTION

G-1. Scope. This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for the performance of organizational maintenance of the modified Pump, Centrifugal.

G-2. General. In addition to Section 1, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. Section 2 – Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of parts, with the components of each part listed in ascending figure and item number sequence. Bulk materials are listed by item name in FIG BULK at the end of the section.

b. Section 3 – Special Tools List. Not applicable.

c. Section 4 – Cross reference Indexes. Not applicable.

G-3. Explanation of Columns (Section 2).

a. FIG NO. (Column 1a). This column lists the number of the figure Where the item is identified/located.

b. ITEM NO. (Column 1b). Indicates the number used to identify Items called out in the illustration.

c. SMR Code.(Column 2).

(1) *Source Code* (2 positions). Codes are entered in the first and second positions of the SMR indicating the source for replacement purposes, i.e., procured and stocked, manufactured or assembled.

Code	Explanation
PA	Item procured and stocked for anticipated or known usage. Items are normally considered for replenishment.
PB	Item procured and stocked for insurance purposes because essentiality dictates that a quantity be available in the supply system.
PC	Item procured and stocked but is deteriorative in nature.
PD	Support item, excluding support equipment, procured for initial issue and stocked only for subsequent or additional initial issues. Not subject to automatic replenishment.
PE	End item and/or support equipment procured and stocked for initial issue for specific maintenance activities
PF	Support equipment which will not be stocked but which will be centrally procured on demand.
PG	Item procured and stocked to provide for sustained support for the life of the equipment. It is applied to an item that, because of probable discontinuance or shutdown of production facilities would prove uneconomical to reproduce at a later time.
PH	Item procured and stocked and has been identified to contain hazardous materiel, item requires recordation in the Hazardous Materiel Information System (HMIS) and a Materiel Safety Data Sheet (MSDS).
PR	End item and/or support item, terminal or obsolete and replaced. No longer authorized for procurement. On hand assets may be issued until exhausted. Then use replacement item.
PZ	Item terminal or obsolete with no replacement, discontinue use.
KD	An item contained in a depot overhaul/repair kit and not purchased separately. Depot kit defined as a kit that provided items required at the time of depot overhaul or repair.
KF	An item contained in a maintenance kit and not purchased separately. Maintenance kit defined as a kit that provides an item that can be replaced at organizational or intermediate levels of maintenance.
KB	Item included in both a depot overhaul/repair kit and a maintenance kit.
MO	Item to be manufactured or fabricated at organizational level.
MF	Item to be manufactured or fabricated at DS level.
MH	Item to be manufactured or fabricated at GS level.
MD	Item to be manufactured or fabricated at depot level.
AO	Item to be assembled at organizational level.
AF	Item to be assembled at DS level.
AH	Item to be assembled at GS level.
AD	Item to be assembled at depot level.
XA	Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly.
XB	Support item with low mortality rate, not procured or stocked.
XC	Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD	Support item with low mortality rate, not stocked. Local purchase or requisition through normal supply channels.

(2) *Maintenance Code* (2 positions).

(a) General. Maintenance codes are assigned to indicate the levels of maintenance authorized to USE, REMOVE, REPLACE, or REPAIR support items. The maintenance codes are entered in the third and fourth positions are as follows:

(b) USE (third position). This position will indicate the lowest maintenance level authorized to remove, replace and use the support item.

Code	Explanation
O	Support item is removed, replaced, used at the organizational level of maintenance.
F	Support item is removed, replaced, used at the DS level.
Code	**Explanation**
H	Support item is removed, replaced, used at the GS level.
K	Repairable item. Item is removed, replaced or used at contractor facility.
D	Item is removed, replaced or used at Depot level only.

(b) REPAIR (fourth position). This position will indicate whether the item is to be repaired and identifies the lowest maintenance level with the capabilities to perform complete repair. This code will only be used if the first position of the SMR code is "P". When a maintenance code is not used a date "-" sign will be entered.

Code	Explanation
O	Maintenance at the organizational level of maintenance.
F	Maintenance at the DS level.
H	Maintenance at the GS level.
K	Repairable item. Item is repaired at contractor facility.
D	Repair at Depot level only.

(3) *Recoverability Code* (1 position). Code entered in the fifth position indicates the desired disposition of the support item.

Code	Explanation
Z	Non-repairable item. When item becomes unserviceable, condemn and dispose of at authorized level.
O	Repairable item. When uneconomically repairable, condemn and dispose at organization level.
F	Repairable item. When uneconomically repairable, condemn and dispose at DS level.
H	Repairable item. When uneconomically repairable, condemn and dispose at GS level.
K	Repairable item. Condemnation and dispose at Contractor facility.
D	Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L	Repairable item. Condemnation and disposal not authorized below depot level.

d. NSN (Column 3). The National Stock Number which is used to identify the item.

e. PART NUMBER (Column 4). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity) that controls the design, specifications, standards, and inspection requirements to identify an item or range of items.

f. DESCRIPTION (Column 5). This column contains the following information:

(1) The Federal Item name and, when required, a minimum description to identify the item.

(2) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.

(3) Part numbers for bulk materials are references in this column in the line item entry for the item to be manufactured/fabricated.

(4) The usable on code. Not applicable.

g. QTY (Column 6). The QTY (quantity per figure column) indicates the quantity of the item used in the illustration figure. A “V” appearing in this column in lieu of a quantity indicates that the quantity is variable and quantity may vary from application to application.

h. UI (Column 7). The UI (Unit of Issue) indicates the unit of issue of the item used in the illustrated figure. A “AR” appearing in this column in lieu of a unit of issue indicates that the unit is as required and may vary from application to application.

i. SOS (Column 8). The SOS (Source of Supply) indicates the source from which the part may be ordered.

G-4. Explanation of Columns (Section 4). Not applicable.

G-5. Special Information. Not applicable.

G-6. How to Locate Repair Parts.

a. When NSN or Part Number is Not Known.

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

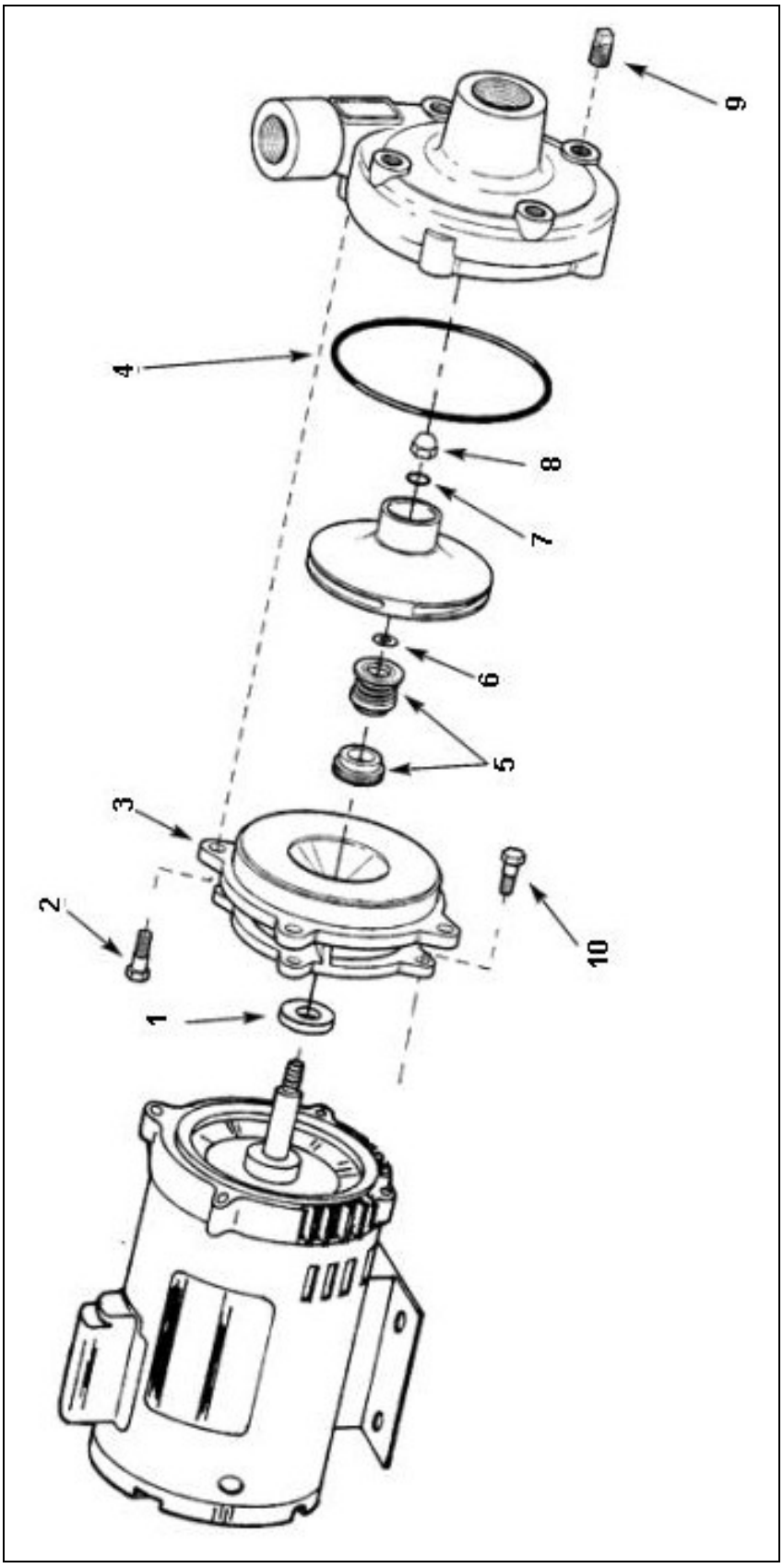
(2) Second. Find the figure covering the assembly group of

Subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and use the corresponding table to find the NSN or Part Number.

b. When NSN or Part Number is Known. Not applicable.

G-7. Abbreviations. Not applicable.


9
4
8
7
6
5
3
2
10
1

(1)		(2)	(3)		(4)	(5)	(6)	(7)	(8)
(a)	(b)								
FIG	ITEM		NSN						
NO.	NO.	SMR	FSC	NIIN	PART NO.	DESCRIPTION	QTY	UI	SOS
1	1	XBF-Z	5310	01-506-3691	1534-000-00	Washer, Blank	1	EA	S9M
1	2	XBF-Z	5305	01-506-3683	1755-001-00	Screw, Cap, Hexagon Head	1	EA	S9M
1	3	XBF-Z	4730	01-506-4207	4900-031-09	Adapter, Machine, Centrifugal	1	EA	S9M
1	4	XBF-Z	5331	01-506-3674	2119-013-00	O-Ring	1	EA	S9M
1	5	XBF-Z	5330	01-506-3567	1640-161-97	Seal, Plain	1	EA	S9M
1	6	XBF-Z	5365	01-506-3452	1806-044-90	Shim Set	1	SE	S9M
1	7	XBF-Z	5331	01-506-3332	2105-037-00	O-Ring	1	EA	S9M
1	8	XBF-Z	5310	01-506-3315	1784-001-00	Nut, Plain, Cap	1	EA	S9M
1	9	XBF-Z	4730	01-506-3286	1768-008-00	Plug, Pipe	1	EA	S9M
1	10	XBF-Z	5305	01-506-3264	1754-001-00	Screw, Cap, Hexagon Head	1	EA	S9M

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